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SPECIAL ARTICLES

A Report on Three Outbreaks of Food Poisoning
Discussion of Some Aspects of Ship Fumigation
Comparative Current State Mortality Statistics

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UNITED STATES PUBLIC HEALTH SERVICE

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DIVISION OF SANITARY REPORTS AND STATISTICS

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They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

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THREE OUTBREAKS OF FOOD POISONING APPARENTLY DUE TO B. ENTERITIDIS, B. PARATYPHOSUS B (AERTRYCKE TYPE), AND B. PARATYPHOSUS A, RESPECTIVELY [1]

There are recorded here three outbreaks of food poisoning of the same clinical type and apparently due to the same group of bacterial organisms. It is interesting to note that two of the outbreaks occurred in hospitals.

(1) OUTBREAK AT SACRAMENTO, CALIF.

By J. C. Geiger, *Professor of Epidemiology, University of California,* Margaret Nelson, and J. P. Gray, *Epidemiologist, California State Department of Public Health*

This outbreak was investigated in the field by one of us (Gray). The epidemiologic and bacteriologic data are as follows: On January 20, about 60 women and their families, members of a lodge auxiliary, attended a banquet in honor of visitors from outside cities. The banquet hall was situated in the basement of a building, and the kitchen in which final preparations were made was found to be in an unclean condition. Dishes were kept on shelves in a cupboard known to be rat infested. No definite information was obtainable, however, as to measures used previously to destroy rats, but it was admitted that such efforts had been made. The cooking utensils were imported from numerous private homes. The menu consisted of a chicken-veal-cream-sauce mixture, tomato sauce made from commercially canned tomatoes, commercially canned peas, fresh cauliflower, coconut and chocolate nut cakes, and coffee.

The meat dish was prepared at the banquet hall early in the evening of the 19th. The chickens had been killed on the 18th and cooked and "boned" that evening. The meat from these was left overnight in a pan. The veal was purchased from a market in an outlying district on the morning of the 19th. During the day the veal and chicken were "diced" at the hall. The chickens and veal were originally prepared by the same person. The "dicing" of

[1] From the George Williams Hooper Foundation, University of California. Received for publication Apr. 27, 1931.

both meats was done on the 19th by several different women. The final preparation, the chicken-veal mixture with a little cream sauce, was put on the stove and slightly warmed for serving.

The tomato sauce was made from freshly opened cans of tomatoes to which gelatin was added. Canned peas were freshly opened and boiled, and a small portion was placed on each plate. Cauliflower was procured from various sources, brought to the hall and boiled. One "button" was served on each plate. The two kinds of cake came from various homes and a few had been purchased from local bakeries. Coffee was made in the hall in a large container.

One person had the preparation of the meats, cauliflower, creamed sauce, and coffee. The preparation of the food, other than the cooking of the meat, was done in the kitchen of the lodge. The banquet was served at 11.35 p. m. Some 60 people were present. Thirty-five cases were reported and investigated.

The symptoms complained of in the cases investigated were nausea, vomiting, abdominal pain, and diarrhea. Many complained of headaches, chilly sensations, faintness, muscular tremors or twitchings, weakness, restlessness, and profound prostration. The presence of fever was unusual. The symptoms were decidedly diminished in severity within 48 hours, and complete recovery occurred in three to four days. There were no complications recorded, though the cases were not accurately followed for sufficient periods to determine this question. The onset was sudden. The shortest incubation period was given as two and one-half hours; the longest not more than four hours.

The type of illness, with so sudden and rapid an onset, with accompanying short incubation periods, and with the universally present symptoms of nausea, vomiting, abdominal pain, and diarrhea, pointed toward food poisoning as the cause. Epidemiologic study of the individual cases shows that all those who were ill ate of the meat preparation. There were a few who ate only of cake and coffee, and these persons were not ill. The epidemiologic data, therefore, definitely point toward the meat dish as being the responsible factor.

Since the chicken and veal were cooked shortly after the animals had been killed or purchased from the market, one turns to the person preparing the dish. The home was insanitary, but no recent illness had been recorded. Stool and urine specimens were negative for bacteria of the food poisoning group.

Laboratory results.—Two types of food specimens were submitted for examination—the creamed cauliflower and the veal-chicken salad preparation. The epidemiologic evidence generally pointed to the salad as the causative food, but the presence of cauliflower in the salad and the use of the "cooked or heated cream-flour sauce" on both,

made it possible that the contamination was general in character or that it was throughout both foods. In fact, the chicken and meat broth was stated to be the fluid used in the so-called creamed or white sauce.

The samples showed gross bacterial contamination, possibly indicating faulty methods of storage or preparation, and making it exceedingly difficult to isolate the probable causative organism. For instance, the creamed cauliflower showed a bacterial dilution count of 60,000,000 organisms per cubic centimeter, of which approximately 25 per cent were nonlactose splitters. The veal-chicken mixture dilution count was over 2,000,000 organisms per cubic centimeter, of which 20 per cent were approximately nonlactose splitters. White mice fed directly with stomach tube according to methods described by Geiger and Meyer (1) and injected intraperitoneally with one-half cubic centimeter amounts of the diluted mixture of both foods, heated and unheated, produced symptoms and death within 24 hours, with typical pathology of food poisoning.

The isolation of a specific bacteria of the food poisoning group presented many difficulties, because of the gross bacterial contamination previously mentioned. Enrichment cultures from the creamed chicken-veal mixture, however, after numerous transplants in selective media, yielded an organism, Gram-negative, sluggishly motile, culturally and serologically, *B. enteritidis*. The organisms isolated proved to be a reliable producer of bacterial poison in veal infusion broth, with ground-up veal suspended in gauze sacks, with Liebig extract, and proteose peptone added, but more so when inoculated intraperitoneally into mice in 0.5 cubic centimeter amounts than when fed by mouth. The poison produced was heat stabile for at least 10 minutes at 240° F. Considering the type of organism isolated, it is most probably the causative factor and its source was not unlikely the incompletely cooked veal.

(2) OUTBREAK AT M. Z. HOSPITAL, SAN FRANCISCO, CALIF.

By J. C. Geiger, Margaret Nelson, and F. Firestone

This outbreak occurred on July 20. The meal was served to patients, staff, and employees of the hospital, and the poisoning involved over 200 persons. The clinical picture was as follows: Incubation period two to four hours. First nausea, then vomiting of a large amount of undigested food, followed by severe retching, abdominal cramps, and diarrhea tinged with blood. Then followed profuse perspiration, rigors, cramps in legs, rapid pulse, utter prostration, and continued diarrhea. Vomiting and retching continued from 2 to 18 hours, diarrhea from 12 to 72 hours. The first two days after the attack there was the usual marked weakness and then gradual recovery, apparently complete in three to seven days.

There were two menus and the only food in common on both menus was a rice pudding covered with a fruit sauce. This fruit sauce was made of the following commercially canned fruits: Pears, pineapple, apricots, and raspberries. The chef who made up this food had been employed at the hospital for the preceding 18 months. Both the first and second chefs' stools were subsequently proved bacteriologically negative for any of the food-poisoning group.

The rice was kept in an open container in the kitchen where considerable repairs were being made. This stock rice on enrichment showed a bacteriological count of 50,000,000 organisms per cubic centimeter. There was not isolated any of the paratyphoid group from this particular sample. Samples of the fruit sauce and the original rice pudding were examined. The fruit sauce was bacteriologically negative. The samples of rice pudding, however, yielded an organism which has been identified culturally and serologically as *B. paratyphosus* B (*aertrycke* type). The other interesting epidemiologic factor is that two days before this rice pudding was prepared members of a rat exterminator firm visited the kitchen hospital and used some material. The suspicion is that a bacteriologic rat virus was used, but this was later vehemently denied. The type of organism isolated tends to confirm this suspicion. The rice pudding itself was steamed in a steam cooker for about an hour in very large pans. It was subsequently removed from the large pans and placed in still larger pans for a period estimated to be from six to eight hours before being served to the patients. The evidence is far from being absolutely complete in view of the fact that the investigation was not begun until July 23 and, consequently, only one stool from a patient was available. This was negative. Therefore, the only statement that can be made is that this is an outbreak of food poisoning, the number of cases estimated to be 200, due to a rice pudding and probably specifically due to the organism isolated, *B. paratyphosus* B (*aertrycke* type), and whose source was not unlikely a bacteriologic rat virus used by a commercial rat exterminator company employed by the hospital.

Laboratory data.—Aside from the isolation of an organism from the rice pudding, some of the original material was fed by stomach tube and injected intraperitoneally into white mice. The animals died in 24 hours with typical pathology of food poisoning. Considerable quantities of the original rice pudding (in excess of two helpings for humans) were fed to one monkey whose normal stool contained no paratyphoid organisms. In about six hours the monkey appeared ill and in some abdominal distress. This was accompanied by profuse diarrhea for 30 hours. Within 48 hours, however, the animal's stools had returned to normal consistency; but prostration, weakness, and muscular twitchings were still to be noted. An organism identical in type with the organism isolated directly from the rice pudding was

obtained readily from the profuse, soft, mucous-containing stools. The cultures obtained from the rice pudding and recovered from the stools of the monkey were grown in a special media for four days at 37° C. When fed by mouth and when injected intraperitoneally into white mice, both the heated (240° F. for 10 minutes) and the unheated cultures caused death with typical pathology. The heated culture, however, showed considerable variation in results. This culture, grown in special media, when injected intravenously in 1 cubic centimeter amounts into rabbits, caused death in the animals, with profuse diarrhea and pathology of a severe enteritis within as short a period as 5 hours, but usually within 24 hours. The same material when injected intraperitoneally in 2 cubic centimeter and 5 cubic centimeter amounts into guinea pigs caused death with pathology of enteritis, and, curiously, even a peritonitis.

(3) OUTBREAK AT F. HOSPITAL, OAKLAND, CALIF.

By J. C. Geiger, Margaret Nelson, and H. L. Wynns, *Epidemiologist, California State Department of Public Health*

The F. hospital cares for about 1,100 persons, including both patients and employees. The investigation was begun by one of us (Geiger) on March 11. The outbreak of food poisoning occurred, however, on March 9 at the noon meal. Fifty-two persons were involved, all having been served at the same table. Eight others were also present, but the records of five of these gave no history of eating the suspected food. Of the 52 cases, all showed symptoms of nausea, vomiting, diarrhea, and great prostration, with an incubation period of three to four hours. The majority showed their initial symptoms within a period of 30 minutes of each other. One case, alleged to have suffered from chronic myocarditis and under treatment for syphilis, died on March 10. An autopsy was performed, with no definite findings recorded. Portions of the liver, spleen, and duodenum were submitted for bacteriological examination. These proved negative, as did three specimens of stools from those ill but 48 hours after the causative meal.

During the investigation of March 11, the following facts were ascertained: An egg soufflé, made with eggs from the hospital farm, and milk from the hospital dairy, was prepared by the chief chef and assistant chef. This dish was prepared mainly by the latter. To it was added commercially canned shrimp, and the entire dish was served to the majority of the patients on Sunday, March 8. No illness occurred. The remainder of this dish was allowed to remain overnight in the kitchen, and was again served after a brief warming and with the addition of some commercially canned peas. On the first investigation by the hospital authorities the canned peas were

thought to have been the causative factor. This warmed-over egg soufflé-shrimp mixture with peas added was served only at the table where the persons ate who became ill. This special dish was served to them because, though they were patients of the hospital, they did extra work around the hospital, and it was served as an additional factor to their meal. The remainder of the meal served at lunch was consumed by over a thousand persons without any serious results.

During the investigation on March 11 particular attention was attracted to the assistant chef by his decided interest. On questioning the medical officer, it was learned that the assistant chef had begun work on March 7 and had not been physically examined, nor had his excreta been examined. Since epidemiologically the causative food was easily ascertainable, the matter of contamination was then gone into. There were two possibilities, because of the nature of the illness, namely, that it was contamination from the human carrier or from an animal carrier such as rats, mice, etc. Close questioning of the housekeeper, however, revealed the fact that the last noticeable presence of rats and mice was about two years ago. There was used at that time a preparation known to contain one of the members of the paratyphoid group. Consistent trapping by the hospital authorities failed to obtain any material for examination.

All the original food had been consumed; therefore, to eliminate the remote possibility of the contamination coming from the commercially canned foods, a can of the same brand and code of both the shrimps and peas were examined and found sterile.

Specimens of stools and urine were obtained from the chief chef and the assistant chef on March 13. The stools were obtained after these persons had received a cathartic. From the stool of the assistant chef there was isolated an organism now identified culturally and serologically as *B. paratyphosus* A. Two other specimens were also submitted; one was received in an unsatisfactory condition, and the other showed no growth. It may be of interest to state that the assistant chef showed an uncooperative attitude, having disappeared when the stools were first requested and causing some difficulty in ascertaining his whereabouts. His history shows him to be a "floater," working short periods of time at various places throughout the country. Therefore, this is an outbreak of food poisoning apparently due to *B. paratyphosus* A, consumed in an egg soufflé-shrimp-pea mixture with ample time for incubation and contaminated by a human carrier, the assistant chef.

Laboratory data.—The strain of *B. paratyphosus* A was isolated from the stools of the assistant chef on direct plating and from tetrathionate enrichment broth. This organism grown in suitable media for four days at 37° C. produced a poison which killed white mice

within 20 hours with both the cooked and live material when 0.5 cubic centimeter amounts were injected intraperitoneally. When fed by stomach tube no results could be shown.

DISCUSSION

Outbreaks of food poisoning due to contamination of the food with *B. enteritidis* as in outbreak No. 1 are comparatively rare in the United States, but not infrequent in continental Europe and Great Britain. Rosenau and Weiss (2), Spray (3), D'Aunoy (4), Toulan (5), Nattkemper (6), Noble (7), and Geiger (8) have, however, reported its isolation from the causative food vehicle, such as home-prepared meat stews, milk or milk and cream, bread pudding, cream puffs, smoked tongue, roast beef sandwiches, and creamed chicken. This organism is generally associated with meat, especially that of pig or cattle, and with such meat products as meat pies, sausages, and hamburger. Ample evidence is available to indicate that it is specifically contaminated food and not decomposed food that will cause gastrointestinal irritation in man. The taste is not changed, neither is the odor noticeable. The isolation from milk or its products, such as cream puffs, bread puddings, and creamed chickens, is an indication of contamination from outside sources. In this connection abundant opportunity is offered through rat and mouse carriers or from these animals naturally infected. This important observation has been reported by several authors, notably Meyer and Matsumura (9), who found by bacteriological examination of 775 rats taken from the rat population of San Francisco, 28 cases infected with *B. enteritidis* and 30 cases with *B. aertrycke*. Furthermore, Geiger (10) has called attention to the fact that beside specific infection and possible carriers in animals, another source of *B. enteritidis* is the commercial rat viruses which are not infrequently used for the destruction of rodents in and around food establishments, especially bakeries and canneries. Health agencies have not generally recognized this possible source of contamination and have not taken steps to regulate the use of such viruses.

B. paratyphosus B (*aertrycke* type) involved in outbreak No. 2 is probably the major organism isolated in food poisoning outbreaks. Moreover, it is a common pathogen for domestic and laboratory animals. Savage and White (11) have reported 14 outbreaks due to this organism in England. Likewise, Geiger (8) has recorded several outbreaks in the United States. The possibility of an organism of this type being used in the commercial rat viruses as noted in outbreak No. 2 is an interesting departure from the usual organism, *B. enteritidis*. *B. paratyphosus* A involved in outbreak No. 3 has been previously reported by Geiger (8) as a causative organism in food poisoning.

At this point one of the numerous difficulties as to classifying causative bacteria now arises, because of the terminology for subtypes of *B. paratyphosus* B. The term "*Salmonella* group" is often used to add to the confusion, while, Savage and White (11) refer to "Mutton and Derby types." Jordan (12) has attempted to classify the matter of types by using the term *B. paratyphosus* B "Schottmüller type" and limiting such a type to organisms coming from human sources. Many investigators, however, classify another type of *B. paratyphosus* B "*aertrycke* type" where the source is presumably from animals.

It is interesting to note, particularly in outbreak No. 3, the absence of infections as would be indicated by prolonged fevers. There did occur, however, three cases of appendicitis in those affected with symptoms of food poisoning shortly after outbreak No. 2. All these different types of organisms isolated in these three outbreaks and considered to belong to the same biological group produced to a varying degree heat stabile poisons. Furthermore, the original food involved in outbreak No. 2 caused symptoms in a monkey, when fed directly by mouth, that resembled very closely those of food poisoning in human beings.

Bibliography

(1) Geiger and Meyer: Proc. Soc. Exper. Biol. and Med., November, 1928, 26, No. 2.
(2) Rosenau and Weiss: J. Am. Med. A., vol. 77, No. 25, Dec. 17, 1921, p. 1948.
(3) Spray, R. S.: J. Am. Med. A., vol. 86, No. 109, 1926.
(4) D'Aunoy, R.: J. Infect. Dis., vol. 45, No. 5, November, 1929, p. 404.
(5) Toulan, A. J.: U. S. Nav. Med. Bull., vol. 23, 1925, p. 171.
(6) Nattkemper, R. L.: U. S. Nav. Med. Bull., vol. 25, 1927, p. 198.
(7) Noble, J. E.: South. Med. J., vol. 17, No. 6, June, 1924, p. 408.
(8) Geiger, J. C.: J. Am. Med. A., vol. 81, October, 1923.
(9) Meyer and Matsumura: J. Infect. Dis., vol. 41, November, 1927, p. 395.
(10) Geiger, J. C.: California and West. Med., vol. 31, No. 5, November, 1929.
(11) Savage and White: Med. Research Council (British). Special Report Series 92.
(12) Jordan, E. O.: J. Infect. Dis., vol. 36, 1925.

SOME ASPECTS OF SHIP FUMIGATION

By J. R. Ridlon, *Surgeon, United States Public Health Service*

The fumigation of ships for the destruction of rodents is a problem which has received much study and attention from various officers of the Public Health Service. The use of suitable cyanogen products has practically replaced the use of sulphur in fumigation at all of the quarantine stations of the larger ports.

Several cyanogen products have been used at San Francisco during the past few years. These, together with the methods, include the following:

1. The generation of straight hydrocyanic-acid gas by a mixture of sodium cyanide, sulphuric acid, and water.

2. The generation of hydrocyanic-acid and cyanogen-chloride gas by a mixture of sodium cyanide, sodium chlorate, hydrochloric acid, and water.

3. Liquid hydrocyanic acid with either cyanogen chloride or chloropicrin as a warning gas.

4. Zyklon-B, which consists of an earthy substance impregnated with liquid hydrocyanic acid and marketed at present with 5 per cent chloropicrin as a warning gas.

The two latter methods of fumigation afford a saving in time and labor and have almost entirely displaced the generation methods at the San Francisco station. Generation of cyanide gas on shipboard with the use of crocks and barrels was a laborious process.

LIQUID HYDROCYANIC ACID

Liquid hydrocyanic acid is also called liquid gas or liquid cyanide, and may be correctly termed prussic acid. This acid when of high-grade purity is exceedingly volatile in warm dry air, and its boiling point is about 74° F. The cylinders containing liquid cyanide should not be exposed to the hot sun for long periods. In use it appears that the vaporization of the gas is more complete on warm days at higher temperatures. It is a colorless liquid and less than three-fourths the weight of water. Hydrocyanic-acid gas is inflammable when concentrated but not so when diluted. Care must be taken not to ignite the concentrated gas.

The liquid hydrocyanic acid is manufactured for commercial use by the generation of gas from a mixture of sodium cyanide, sulphuric acid, and water. The gas is led from the closed generator through a series of refrigerated pipes and condensed to a liquid. The liquid can be distilled to separate excess water from the acid until a purity of 96 to 98 per cent is obtained (1).

In general, liquid cyanide is used chiefly for the fumigation of fruit trees or fruit products for the control of insect pests and for ship fumigation for the destruction of rodents and insects. The use of liquid cyanide for tree fumigation was begun in this country in 1916 and has become a popular method of insect control (2).

The use of "liquid gas" in ship fumigation was started at the San Francisco station in 1925 and was extensively used during 1926. Our records show that this method was employed in whole or in part in the fumigation of about 1,000 vessels during the period July, 1927, to April, 1930.

The liquid cyanide has been used with either 20 per cent cyanogen chloride or 10 or 5 per cent chloropicrin as a warning gas. In the

former case the cylinders as purchased are labeled to contain hydrocyanic acid not less than 76 per cent, cyanogen chloride not less than 20 per cent, and inert matter not more than 4 per cent. In the latter case the labels read: "Hydrocyanic acid not less than 91 per cent, chloropicrin not less than 5 per cent, and inert matter not more than 4 per cent."

The liquid cyanide is shipped to this station from the manufacturing plant in heavy metal cylinders containing 75 pounds avoirdupois each. This method of shipment conforms to the Federal interstate regulations.

The equipment necessary for ship fumigation consists of a small motor attached to an air pump and a supply of dosing cylinders equipped with the proper valves and rubber hose.

The dosing, or applicating, cylinders are about 2 feet tall and have a capacity of about 10 pounds. They are made from heavy-gage metal and weigh about 21 pounds when empty. The liquid cyanide is forced from the large shipping cylinder into the small dosing cylinder by compressed-air pressure. It is customary to use one cylinder for each hold or other large compartment. Having a record of the cubic capacity of each hold, the dosage is computed on the basis of 60 gm. (2 oz.) per 1,000 cubic feet. The small cylinder is balanced upon a pair of scales, and then the scales are set to weigh the desired amount of liquid.

A rubber hose leads from the air pump to the large cylinder and another hose from the large cylinder to the dosing cylinder. When air pressure is applied and the valves are opened, enough liquid is forced over from the large cylinder to bring the small cylinder up to the required weight. (Fig. 1.)

Before taking the small cylinders to the vessel, compressed air is pumped into them to give a pressure of about 100 pounds, which is indicated upon a gauge on top of the cylinder. (Fig. 2.) A rubber hose about 10 feet in length is attached to the cylinder before use. This hose has a fine nozzle on the end of it. When ready for use, the hose is put down through the hatch opening into the hold and a valve on top of the cylinder is opened. (Fig. 3.) Then the compressed air forces the liquid cyanide through the fine nozzle, and it is expelled as a mist, which immediately becomes gas. The liquid is subjected to atomization and is discharged in a vapory spray. The gas diffuses and permeates through the open spaces of the compartment or hold.

The cylinders and hose are washed out frequently and the apparatus checked over before use. The applicating cylinders when loaded rarely exceed 30 pounds in weight and can be transported by launch to the vessel and easily handled.

An apparatus has been recently supplied for the use of small doses in individual compartments. This is a metal portable container for

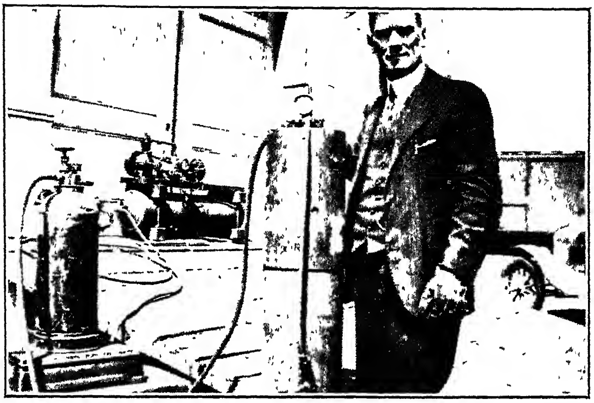

FIGURE 1.—Air pump and motor in background, connected by rubber hose with shipping cylinder and dosing cylinder, the latter being shown on the scales, which are set to the desired amount

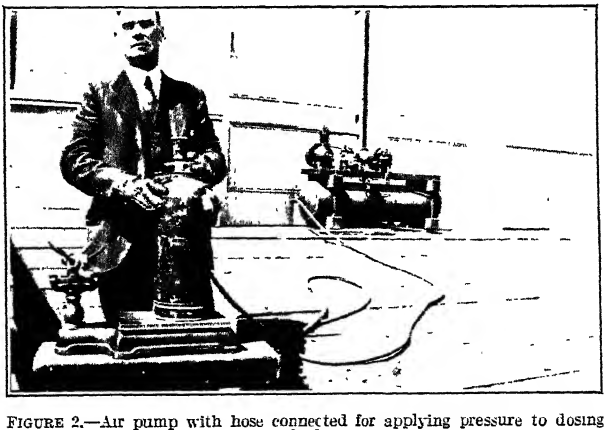

FIGURE 2.—Air pump with hose connected for applying pressure to dosing cylinder

FIGURE 3.—Method of dosing holds with liquid hydrocyanic acid. Rubber hose is inserted under tarpaulin covering hatch

FIGURE 4.—Dosing cylinder with hand air pump and measuring device for dosing small compartments

the liquid cyanide, to which is attached a hand-operated air pump and accurate measuring devices. A rubber hose with a spray nozzle is attached to the cylinder or container. (Fig. 4.) An upward stroke of the pump draws a graduated amount of the liquid into the pump, which is expelled in a fine mist on the downward stroke of the pump. This is very convenient for dosing a series of isolated rooms requiring only a few ounces each.

Both of the warning gases which have been used with liquid cyanide produce a tear effect. The effect of the 20 per cent cyanogen-chloride gas is greater than that of 5 per cent chloropicrin, i. e., lachrimation is much more marked; and it is believed that, on account of the tear effect, a person unfamiliar with fumigation could escape from a small room containing hydrocyanic-acid gas with 20 per cent cyanogen chloride before inhaling a dangerous amount of cyanide.

The lachrimation which is produced by 5 per cent chloropicrin is much less, and even when used by experienced fumigators it would seem desirable to have a more pronounced warning effect. One should always use test animals to see whether a ship's hold is free of cyanide gas after using this irritant as a warning gas.

Liquid gas with 5 per cent chloropicrin is quoted at a cheaper price than with 20 per cent cyanogen chloride. Since the former mixture contains 91 per cent hydrocyanic acid as against 76 per cent in the latter mixture, more lethal power is purchased for less money. Experiments at this station with roaches indicate that the former mixture is more deadly for that insect and presumably so also for rats.

EQUIVALENTS

The quarantine regulations prescribe that when using the generation method there shall be used for killing rats 5 ounces (150 gm.) of sodium cyanide with an appropriate amount of sulphuric acid and water per 1,000 cubic feet.

It is stated (2) that, based on chemical determination, 1 ounce (30 gm.) of 97 per cent sodium cyanide (containing not less than 51 per cent cyanogen) with 93 per cent gas generation equals 20.44 cubic centimeters of liquid gas, 98 per cent purity at 60° F. Then, 5 ounces (150 gm.) of sodium cyanide under the same conditions would equal 102.2 cubic centimeters. At 60° F. 40 cubic centimeters of 97 per cent liquid gas weighs 30 gm., so that the equivalent of 150 gm. of sodium cyanide would be 76.5 gm. of liquid gas.

It is probable, though, that under actual working conditions, with varying temperatures, not more than 60 to 80 per cent of the potential amount of gas is generated and liberated. Allowing 80 per cent generation, 63 gm. of liquid gas, 98 per cent pure, should be considered as at least the equivalent in lethal effect of 150 gm. of sodium cyanide.

The regulations prescribe that when generating hydrocyanic-acid-cyanogen-chloride mixture there shall be used 4 ounces (120 gm.) of sodium cyanide with 3 ounces (90 gm.) of sodium chlorate and an appropriate quantity of hydrochloric acid and water. Then 120 gm. of sodium cyanide at about 80 per cent generation would yield 52.5 gm. of liquid gas 98 per cent pure at 60° F.

In practice it is customary and desirable to use 60 gm. of liquid cyanide, mixed with either 20 per cent cyanogen chloride or 5 per cent chloropicrin per 1,000 cubic feet for rat and vermin destruction. However, we know that under laboratory conditions a very much smaller dose of cyanide will kill rats promptly.

ZYKLON-B

Zyklon-B is liquid hydrocyanic acid absorbed by an earthy substance called "diatomite" and packed in strong tin containers. Cans are provided containing 15 grams, 120 grams, 480 grams, and 1,200 grams of hydrocyanic acid with 5 per cent chloropicrin as a warning gas. The cans at present are packed with a slight vacuum, which is shown by dents or sinking in of the sides of the cans.

The fumigator opens the cans by knocking holes in each end with a special hammer and sprinkling the contents on the floor of the hold or spreading in a thin layer on canvas or paper on the floor of a compartment. The hold may be dosed by a fumigator standing on deck, and the residue of diatomite, which is left after the hydrocyanic acid has evolved, may be left on the floor of the hold (3). It is customary to throw the residue overboard after use in the superstructure compartments.

Directions on the cans state that Zyklon-B may be satisfactorily used in the proportion of 60 grams per 1,000 cubic feet. Experiments by Akin and Sherrard (3) show that rats are killed under laboratory conditions in 30 to 45 minutes by one-twelfth of this dose, or 5 grams per 1,000 cubic feet. This applies to straight liquid hydrocyanic acid 96 to 98 per cent pure and should equally apply to Zyklon-B. Experiments at this station on ships show that it is not safe to rely in practice upon less than the standard dose of 60 grams per 1,000 cubic feet.

The time of exposure is prescribed as two hours for an empty vessel and four hours for a vessel with cargo aboard. The longer time allows for more complete penetration. It must be understood that all holds or compartments are tightly sealed during fumigation.

SAFETY MEASURES

Gas masks must be worn by fumigators when in any way exposed to the fumes of cyanide gas in dangerous concentration. This is necessary when opening cans of Zyklon-B, when dosing compartments with

liquid cyanide, and when opening up compartments for ventilation. The canister attached to the mask is charged with chemicals which neutralize hydrocyanic-acid and cyanogen-chloride gas. These absorbent chemicals are a caustic silicate and an impregnated charcoal (4). They offer little resistance to breathing and are effective for several hours' use. The absorptive and neutralizing capacity of the canister becomes exhausted gradually, so that ample warning is given to replace the worn-out canister.

Two men should always work together in any place where there is danger from gas, such as in the holds or in compartments not immediately adjacent to an exit.

Test animals, such as rats or guinea pigs, should always be lowered into holds following fumigation, to test for the presence of gas in dangerous quantity before the fumigator himself goes below to make the final inspection.

Hydrocyanic-acid gas is one of the most deadly gases known and should be used with great care and caution. A person exposed for a short period to a strong concentration of cyanide gas, even though wearing an efficient gas mask, will suffer a marked effect from the gas. This is probably explained by absorption through the clothing and moist skin.

COMPARATIVE MERITS

At present the cost of liquid hydrocyanic acid with 5 per cent chloropicrin is slightly less than that of Zyklon–B.

The two fumigants possess equal lethal power. They are both convenient to use and require an equal number of fumigators on shipboard. In dosing the holds it is necessary only to open a valve when using the liquid gas; and the new cylinder which delivers small accurate doses is convenient for use in small rooms.

In using Zyklon–B it is necessary only to knock holes in the cans and sprinkle out the contents. The empty cans are thrown away.

The preparations for the use of liquid gas require a little more attention, as the dosing cylinders must be accurately checked, weighed, and filled with compressed air before proceeding to the vessel.

At a station where there is regular routine ship fumigation and cylinders of liquid gas can be received at frequent intervals, this fumigant is very satisfactory. Loaded cylinders, however, should not be stored with air pressure applied, as there may be a degree of deterioration of the gas.

If only infrequent fumigations are done, Zyklon–B would be very satisfactory, as this material can be stored for a longer time before use.

The opening of many small cans of Zyklon–B in a closed space is attended with danger from absorption through the clothing, especially

if fumigators are perspiring. In using liquid gas the operator need not be in intimate exposure to the applied gas.

It is found that a combination of the two methods makes an ideal way of fumigation. It is common practice at this station to use both methods in combination on the same vessel.

REFERENCES

(1) University of California Publications. Bulletin No. 308.
(2) U. S. Department of Agriculture. Farmers Bulletin No. 1321.
(3) Akin and Sherrard: Fumigation with Cyanogen Products. Pub. Health Rept., vol. 43, No. 41, October 12, 1928, p. 2647.
(4) The Military Surgeon, vol. 62, No. 5, May, 1928, p. 693.

COMPARATIVE CURRENT STATE MORTALITY STATISTICS[1]

The present report on mortality from certain causes covers, for a majority of the States included, the months January to March, 1931. For some of the States the data for all of these months are not available. The present plan is to publish about three current reports during the year, covering periods of approximately 3 months, 6 months, and 9 months, respectively, with a more complete annual summary of death rates for the calendar year at as early a date as possible in the following year. It is impossible to present data for all of the States on this basis of 3, 6, and 9 months, but each State is included in each report for as many months as possible with rates in each case for the "year to date" and comparative rates for the same period in preceding years. This arrangement makes it possible to compare the mortality of the current calendar year with the mortality of preceding years in the same State.

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of (*a*) some lack of uniformity in the method of classifying deaths according to cause, (*b*) some delayed death certificates, and (*c*) various other reasons, these preliminary rates can not be expected to agree in all instances with final rates published by the Bureau of the Census, which are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the accompanying table are intended to serve only as a current index of mortality until final figures are issued by the Bureau of the Census.

Populations used in computing rates are estimates as of July 1 of each year, based on the 1920 and 1930 censuses.

[1] From the Office of Statistical Investigations, United States Public Health Service.

Death rates from certain causes in stated periods of 1931, with comparative data for corresponding periods in preceding years

State	Period	Year	Rate per 1,000 population, all causes (annual basis)	Rate per 1,000 live births: Infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality (143–150)	Rates per 100,000 population (annual basis): Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31–37)	Cancer, all forms (43–49)	Diabetes (57)	Diseases of the nervous system (70–86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87–96)	Diseases of the heart (87–90)	Diseases of the respiratory system (97–107)	Pneumonia, all forms (100–101)	Diseases of the digestive system (108–127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
Alabama	Jan. to Mar.	1931	11.4	74	49	8.1	1.5	12.2	1.8	3.2	5.3	85.7	0.6	1.1	5.7	79.3	50.3	11.5	93.8	61.0	127.4	117.9	159.4	142.3	53.8	5.3	95.2
		1930	11.4	78	47	8.3	2.1	3.8	.9	8.4	5.5	66.7	.3	.6	2.3	82.1	45.4	10.1	97.1	61.2	147.1	135 2	137.1	126 4	53.5	7.5	94.8
		1929	15.0	100	68	7.7	1.7	3.9	1.7	9.0	6.3	388.6	1.1	1.7	2.2	82.5	41.1	9.9	94.5	54.7	140.4	131.2	177.2	168.0	86.6	5 7	87.0
		1928	12.4	92	56	8.1	4.7	13.6	.6	6.5	7.3	95.5	.6	[1]	[1]	92.1	42.3	11.6	[1]	58.1	[1]	123 0	[1]	170.9	[1]	7.6	78.3
		1927	9.6	62	35	6.8	3.8	3.3	1.3	10.0	5.2	30.9	.2	[1]	[1]	73.6	44.3	6.8	[1]	49.5	[1]	95.2	[1]	91.6	[1]	6.2	68.8
Arizona	Jan.	1931	16.6	182	131	13.5	2.6	15.8	[2]	5.3	10.5	84.1	[2]	2.6	18.4	346.9	39.4	7.9	113.0	57.8	165.6	128.8	349.5	247.0	81.5	15.8	63.1
		1930	16.3	136	97	4.2	8.1	[2]	2.7	8.1	10.7	43.0	[2]	2.7	56.4	351.9	51.0	13.4	145.1	61.8	163.9	150.4	314.3	263.3	86.0	37.6	37.6
		1929	14.6	119	78	3.2	13.7	[2]	[2]	5.5	[2]	11.0	[2]	2.7	11.0	316.1	41.2	[1]	79.7	46.7	142.9	131.9	112.7	74.2	230 4	151.2	44.0
Connecticut	Jan. to Feb.	1931	11.5	66	[1]	[1]	[2]	4.2	1.1	1.9	.8	54.8	[2]	.8	.4	59.0	105.1	33.7	[1]	[1]	[1]	224 2	[1]	128.9	[1]	7.2	86.2
		1930	11.4	75	[1]	[1]	.7	[2]	3.7	3.7	4.4	23.4	1.5	2.2	2.2	52.6	121.9	24.8	[1]	[1]	[1]	224 8	[1]	124.1	[1]	8 0	76.6
		1929	16.1	84	[1]	[1]	.7	3.7	2.2	6.7	3.7	203.1	[2]	.7	[2]	68.2	101.5	16.3	[1]	[1]	[1]	264 6	[1]	263.1	[1]	5.2	83.8
		1928	12.1	75	[1]	[1]	2.3	3.0	.8	2.3	8.3	29.4	1.5	3.0	.8	65.6	117.5	[1]	[1]	[1]	[1]	174.1	[1]	145 4	[1]	9.8	[1]
		1927	12.4	77	[1]	[1]	1.5	1.5	1.5	5.3	6.1	38.9	.8	[2]	[2]	76.2	118.9	[1]	[1]	[1]	[1]	208.8	[1]	131.1	[1]	12.2	[1]
Dist. of Col.	Jan. to Mar.	1931	18.6	73	41	6.1	3.3	.8	1.6	.8	6.6	49.4	1.6	[2]	8.2	124.2	145.6	28.8	185.9	119.3	426.9	357.0	312.6	282.2	99.5	6.6	161.2
		1930	16.1	69	35	10.4	[2]	[2]	4.2	4.2	5.8	11.6	[2]	.8	.8	127.1	126.3	33.2	152.1	111.3	409.6	350.7	197.8	163.7	83.9	2.5	191.1
		1929	20.0	83	45	8.2	.8	[2]	2.5	7.6	12.6	71.3	[2]	[2]	2.5	142.6	135.0	32.7	167.8	109.0	502.7	428.0	319.7	288.7	107.4	5.9	207.3
		1928	16.6	[1]	[1]	[1]	1.7	.8	1.7	3.4	8.4	24.4	[2]	[2]	.8	122.7	124.4	36.9	169.6	124.4	383.3	340.4	251.3	214.1	88.2	10.9	178.8
		1927	18.2	[1]	[1]	[1]	1.7	[2]	.9	3.4	8.5	56 8	[2]	3.4	.9	135.5	124.8	21.4	201.7	143.6	390.0	345.0	265.0	231 0	92.3	3.4	204 3
Georgia	Jan. to Feb.	1931	11.0	84	[1]	10.1	3.6	1.5	.9	3.0	4.7	83.8	.2	.4	3.2	67.0	47.6	9.6	113.7	[1]	138.6	128.8	146.3	136.7	45.9	3.2	116.3
		1930	11.4	89	[1]	10.2	2.8	3.0	1.3	7.2	6.2	67.6	1.7	.2	5.3	72.3	43.5	12.1	122 1	[1]	151.9	138.7	147.3	133.9	54.5	5.9	139.9
		1929	14.6	[1]	[1]	[1]	2 3	2.1	1.9	4.3	5.5	377.8	[1]	[1]	[1]	69.1	42.4	12.2	[1]	[1]	[1]	116.8	[1]	158.6	[1]	4.9	148.6
Hawaii	Jan. to Mar.	1931	10.6	76	[1]	[1]	5.3	11.6	[2]	[2]	8.5	8.5	[2]	[2]	1.1	104.8	46.6	14.8	[1]	59.3	[1]	131.3	[1]	122 8	111.2	50.8	76.2
		1930	12.1	100	[1]	[1]	3.4	7.9	[2]	9.1	17.0	14.7	[2]	[2]	10.2	104.2	52.1	12 5	[1]	48.7	[1]	148.4	[1]	131.4	182.4	111.0	85.9
		1929	14.2	116	[1]	[1]	5.8	3.5	[2]	36.0	9.3	25.6	[2]	[2]	33.7	96.5	65.1	9.3	[1]	56.9	[1]	131.3	[1]	183.6	206.8	131.3	[1]
		1928	12.6	[1]	[1]	[1]	5.8	3.5	[2]	3.5	16.1	11.5	[2]	[2]	3.5	142.9	68.0	5.8	[1]	54.2	[1]	125.6	[1]	185.5	165.9	96.8	[1]

[1] Not available.

[2] No deaths.

Death rates from certain causes in stated periods of 1931, with comparative data for corresponding periods in preceding years—Continued

State	Period	Year	Rate per 1,000 population, all causes (annual basis)	Rate per 1,000 live births: Infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality (143–150)	Rates per 100,000 population (annual basis): Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31–37)	Cancer, all forms (43–49)	Diabetes (57)	Diseases of the nervous system (70–86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87–96)	Diseases of the heart (87–90)	Diseases of the respiratory system (97–107)	Pneumonia, all forms (100–101)	Diseases of the digestive system (108–127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
Idaho	do	1931	10.6	67	51	4.6	0.9	1.8	2.7	10.9	0.9	19.1	0.9	1.8	10.0	29.9	69.0	13.6	132.5	104.3	198.7	176.9	138.8	127.9	66.2	2.7	46.3
		1930	9.8	59	30	5.5	1.8	3.6	3.6	.9	3.6	9.1	(2)	(2)	12.7	34.5	58.2	4.5	108.2	63.6	197.2	180.0	145.4	120.9	53.6	1.8	35.5
Indiana	do	1931	(1)	(1)	(1)	7.0	1.4	7.8	5.7	4.7	4.8	80.3	.2	.7	8.2	59.0	103.9	17.1	(1)	122.2	(1)	183.0	(1)	163.9	(1)	5.7	79.2
		1930	12.7	59	28	6.5	1.3	1.8	3.3	4.7	5.3	30.7	.3	.8	17.3	72.6	104.1	19.1	(1)	121.9	(1)	199.8	(1)	130.4	(1)	6.8	89.2
		1929	15.0	83	(1)	7.9	.8	6.1	5.4	6.5	5.1	179.6	.4	(1)	.8	77.6	95.7	17.1	(1)	127.3	(1)	223.0	(1)	191.7	(1)	8.9	88.3
		1928	12.6	66	(1)	5.8	1.8	1.8	3.0	4.7	6.8	54.2	(1)	(1)	(1)	74.8	101.9	(1)	(1)	122.5	(1)	182.6	(1)	136.9	(1)	9.0	81.1
		1927	12.2	68	(1)	7.8	3.5	3.1	4.8	7.7	7.5	45.9	(1)	(1)	(1)	80.3	99.0	(1)	(1)	100.2	(1)	175.2	(1)	118.5	(1)	7.7	90.2
Iowa	do	1931	11.3	69	35	6.1	.7	.2	2.6	2.6	1.5	59.4	.2	3.1	4.7	31.9	115.6	25.8	130.3	110.1	256.9	232.5	130.8	119.5	64.6	3.8	39.7
		1930	11.4	68	30	7.5	1.1	11.5	4.9	5.4	3.1	48.4	.2	2.3	2.0	38.3	107.9	25.5	146.3	98.0	272.1	194.0	137.5	125.0	68.3	3.3	44.0
		1929	12.4	68	29	7.7	1.0	1.2	3.1	4.9	.2	156.7	1.2	2.1	3.0	35.7	107.3	20.9	148.8	104.9	285.6	252.6	124.6	108.5	60.7	3.3	56.1
		1928	10.8	64	29	6.2	2.5	(1)	2.5	2.6	3.9	49.1	.3	1.3	1.3	34.0	104.8	19.6	140.0	104.6	266.5	239.0	110.8	99.2	62.9	3.4	56.4
Maryland	do	1931	15.8	86	49	6.4	1.0	4.9	2.2	5.1	3.7	60.5	.5	2.0	2.0	102.9	119.6	27.2	163.7	132.8	348.0	319.3	260.2	241.9	72.0	12.5	152.4
		1930	14.1	69	38	4.1	2.0	.2	3.2	6.1	4.1	18.3	(2)	1.0	2.4	110.4	106.5	23.7	157.3	119.5	307.9	273.6	200.4	179.9	68.5	9.8	168.0
Michigan	Jan. to Feb.	1931	10.6	68	31	6.0	.9	.7	3.7	4.0	4.5	29.2	.4	.9	3.6	57.4	85.1	20.1	123.0	91.9	251.4	224.8	113.2	97.6	67.8	5.2	65.3
		1930	11.4	78	36	8.4	.5	4.1	3.8	3.6	9.9	22.9	(2)	2.0	14.6	58.5	88.1	18.0	127.5	97.2	248.9	221.0	130.8	108.8	74.5	7.9	66.0
		1929	14.5	94	54	6.8	1.2	1.2	4.7	7.2	10.0	155.8	.8	1.3	9.2	73.6	94.8	23.4	153.6	107.3	301.2	265.7	200.0	176.5	85.1	14.8	76.2
Minnesota	do	1931	10.6	65	30	5.3	.2	.5	1.7	2.6	1.0	38.6	.5	1.7	1.2	41.1	115.2	25.1	101.3	78.6	223.7	199.8	139.8	130.7	66.4	2.6	57.8
		1930	10.8	46	19	6.0	1.2	7.0	2.4	3.4	2.2	32.0	(2)	2.2	3.8	49.8	118.9	21.2	111.6	88.5	210.1	199.0	107.8	110.7	64.2	6.5	53.2
		1929	12.7	74	39	5.8	.2	4.4	4.6	8.5	2.4	160.9	.5	3.2	3.2	54.8	109.0	26.2	114.9	84.6	246.2	201.4	133.8	127.5	64.9	3.9	71.7
		1928	10.4	(1)	(1)	(1)	.5	(2)	3.4	1.5	3.2	23.9	.2	1.2	.7	63.2	113.2	21.5	(1)	(1)	(1)	175.4	(1)	86.4	(1)	(1)	70.3
Mississippi	do	1931	11.6	(1)	(1)	(1)	2.7	.3	.3	2.1	7.6	94.1	.3	.3	3.6	75.6	49.2	11.2	(1)	71.3	(1)	116.9	(1)	125.4	(1)	3.6	94.7
		1930	12.0	(1)	(1)	(1)	4.0	2.2	.3	7.1	8.3	71.3	1.2	(2)	9.8	77.4	42.4	11.7	(1)	75.6	(1)	111.9	(1)	118.9	(1)	6.8	94.3
		1929	16.9	(1)	(1)	(1)	4.3	7.8	(2)	9.6	5.6	497.5	.6	.3	.9	70.5	41.9	8.1	(1)	71.7	(1)	98.1	(1)	136.0	(1)	3.1	97.5

New Jersey	Jan. to Mar.	1931	12.4	72	(1)	5.9	.7	4.3	3.6	3.1	5.6	39.0	.2	1.1	2.3	71.7	110.7	27.9	118.3	88.4	310.4	280.2	164.1	149.9	67.0	8.1	107.1
		1930	11.7	70	(1)	5.8	.6	3.5	2.4	3.2	12.9	15.9	.1	.8	2.6	69.4	100.2	26.1	116.4	86.3	285.5	260.2	142.5	128.9	69.1	8.5	107.0
		1929	14.3	78	(1)	5.6	.6	1.6	1.3	8.5	14.1	80.6	.4	1.7	2.7	78.8	106.7	26.9	132.2	97.7	334.7	309.5	237.2	215.8	71.4	9.2	117.3
		1928	12.2	(1)	(1)	(2)	1.0	5.3	2.8	5.8	14.3	17.6	(1)	(1)	(1)	70.7	101.9	(1)	118.4	(1)	272.3	(1)	170.7	98.7	64.4	10.0	115.8
		1927	12.3	(1)	(1)	(1)	1.1	1.1	4.8	6.0	9.7	22.2	(1)	(1)	(1)	80.3	101.9	(1)	135.9	(1)	263.3	(1)	160.8	88.5	79.2	14.1	105.5
New York [3]	Jan. to Feb.	1931	14.2	76	35	6.5	.4	.8	2.6	4.5	3.1	34.7	.4	1.2	1.2	65.2	137.2	33.7	145.6	116.4	410.9	370.1	159.5	140.6	68.6	8.5	127.6
		1930	13.2	66	29	6.5	.7	1.7	1.9	3.1	3.8	15.5	.3	1.1	1.0	68.4	115.8	30.4	137.0	103.8	378.6	327.6	138.7	122.2	73.2	10.4	133.4
		1929	18.3	84	42	7.2	1.0	5.1	4.1	5.6	4.0	170.3	.7	1.1	1.2	83.5	137.1	36.0	185.2	145.7	496.4	439.9	262.8	235.0	71.4	9.8	133.5
		1928	13.9	70	30	7.2	1.9	3.6	3.6	3.5	5.3	20.4	.4	1.3	.9	74.1	124.8	27.5	164.7	126.6	388.0	337.5	142.3	125.8	77.5	11.2	120.1
		1927	13.9	77	36	6.0	3.2	5.6	2.1	5.3	5.5	25.7	.1	.9	(2)	77.8	122.4	27.2	104.7	126.0	365.6	315.9	154.4	132.8	80.0	13.4	123.6
No. Carolina	Jan. to Mar.	1931	11.5	89	(1)	(1)	1.5	2.1	2.7	4.1	7.2	86.0	.2	.4	.1	73.5	(1)	(1)	(1)	(1)	(1)	(1)	(1)	156.1	(1)	2.5	(1)
		1930	12.0	83	(1)	(1)	.8	.1	1.4	9.2	6.7	50.3	.4	.6	.9	84.5	(1)	(1)	(1)	(1)	(1)	(1)	(1)	156.5	(1)	6.2	(1)
		1929	13.9	(1)	(1)	(1)	2.1	1.3	1.7	7.1	10.0	241.4	.8	(2)	.3	85.0	(1)	(1)	(1)	(1)	(1)	(1)	(1)	154.0	(1)	7.7	(1)
		1928	11.4	(1)	(1)	(1)	2.1	37.2	2.4	7.3	8.9	58.5	.5	1.1	(1)	79.5	(1)	(1)	(1)	(1)	(1)	(1)	(1)	154.8	(1)	9.8	(1)
Pennsylvania	Jan. to Feb.	1931	13.3	77	44	6.2	1.0	5.7	3.0	2.0	4.7	65.1	.1	1.4	2.9	60.6	97.6	28.4	122.0	95.5	313.1	279.1	187.1	167.4	69.2	13.5	104.8
		1930	12.6	76	45	6.0	.7	2.4	2.7	5.4	7.7	31.7	.4	1.0	2.7	62.6	93.6	22.8	125.7	94.3	287.3	257.5	159.3	142.8	72.9	13.2	111.1
		1929	17.4	107	68	7.1	1.7	7.4	4.2	10.9	9.1	241.4	.7	1.7	2.3	77.4	104.5	30.1	149.9	109.3	347.7	317.5	262.5	234.4	76.5	15.1	133.1
		1928	13.0	75	39	5.5	1.1	3.9	3.7	4.2	13.4	38.2	.6	.8	.1	65.5	96.6	21.9	(1)	101.5	(1)	249.1	(1)	132.8	(1)	16.9	118.1
		1927	13.5	88	50	6.8	1.7	5.4	4.0	6.8	10.1	47.8	(1)	1.3	.5	73.6	94.5	21.5	(1)	99.8	(1)	249.9	(1)	163.5	(1)	19.2	124.2
So. Carolina	Jan. to Mar.	1931	(1)	(1)	(1)	(1)	2.6	3.9	.7	1.9	3.7	153.3	.7	2.1	2.8	69.5	40.2	9.1	(1)	(1)	270.4	(1)	(1)	163.1	(1)	(1)	117.8
		1930	(1)	(1)	(1)	(1)	5.6	.2	.5	12.9	6.3	74.6	.5	3.3	7.7	70.2	34.6	8.0	(1)	(1)	313.7	(1)	(1)	152.5	(1)	(1)	106.4
		1929	(1)	(1)	(1)	(1)	5.4	(2)	.5	7.0	6.6	230.4	.7	2.8	2.6	74.6	37.3	9.6	(1)	(1)	303.5	(1)	(1)	142.4	(1)	(1)	92.4
		1928	(1)	(1)	(1)	(1)	4.4	47.4	.2	10.7	9.1	95.8	1.4	4.2	1.9	85.2	40.4	13.6	(1)	(1)	280.1	(1)	(1)	179.5	(1)	(1)	105.4
		1927	(1)	(1)	(1)	(1)	5.2	1.4	(2)	4.2	5.2	28.1	.7	3.1	1.2	86.8	38.2	9.7	(1)	(1)	282.8	(1)	(1)	147.9	(1)	(1)	88.4
So. Dakota	Jan. to Feb.	1931	9.0	76	43	1.5	1.8	(2)	.9	7.1	4.4	52.1	3.5	(2)	(2)	30.0	80.4	19.4	112.2	75.1	144.9	127.3	104.3	87.5	68.9	4.4	38.0
		1930	7.6	61	27	7.6	1.8	2.7	(2)	2.7	2.7	31.3	.9	(2)	(2)	31.3	68.8	19.7	73.3	42.9	128.7	107.3	77.8	67.9	45.6	5.4	51.8
		1929	10.5	91	52	8.1	3.6	(2)	3.6	2.7	.9	194.6	3.6	.9	1.8	56.7	59.4	20.7	82.9	52.2	160.3	145.9	135.1	114.4	60.3	3.6	33.3
		1928	8.2	71	35	5.3	1.8	1.8	3.6	6.3	2.7	25.1	(1)	(1)	(1)	77.0	59.1	13.4	97.6	51.0	116.4	92.2	88.6	75.2	62.6	9.8	30.4
Tennessee	Jan. to Mar.	1931	11.2	87	61	8.7	2.4	6.4	2.4	3.2	3.4	84.3	.6	.3	9.6	105.7	52.5	11.6	97.0	60.3	134.6	121.1	164.9	152.6	50.9	4.0	63.5
		1930	11.7	75	49	8.9	3.6	7.6	1.5	6.4	4.3	62.0	.8	1.0	19.1	123.8	53.9	11.5	103.4	59.4	136.9	123.5	143.9	131.9	60.7	5.2	81.1
		1929	15.3	108	78	9.4	2.3	.3	3.0	7.0	5.5	341.6	.8	.3	2.0	137.1	53.0	11.1	105.7	57.5	155.4	144.1	177.5	162.4	55.1	5.2	71.4
		1928	12.1	(1)	(1)	(1)	4.1	16.6	2.4	5.8	5.0	83.2	.9	.5	.6	134.7	53.4	10.2	(1)	(1)	(1)	118.2	(1)	159.8	(1)	4.2	(1)
		1927	11.1	(1)	(1)	(1)	9.0	6.6	2.2	14.1	6.6	50.5	.6	.3	.6	130.2	(1)	(1)	(1)	(1)	(1)	(1)	(1)	125	(1)	5.3	(1)
West Virginia	Jan. to Feb.	1931	10.4	(1)	(1)	5.1	7.0	1.8	2.5	15.3	5.6	76.7	1.1	(2)	.4	57.8	51.5	13.7	92.8	65.5	146.7	122.5	177.5	165.6	46.6	7.4	53.9
		1930	10.3	(1)	(1)	5.5	6.1	5.3	2.5	8.2	7.5	47.8	.4	(2)	.7	78.1	49.6	13.9	88.1	57.8	156.5	118.7	134.8	124.1	56.3	13.5	64.5
		1929	15.4	(1)	(1)	6.5	9.4	4.0	2.2	18.5	6.2	414.1	1.1	1.8	2.2	74.2	61.2	12.7	94.1	55.0	214.3	132.5	203.8	153.5	53.9	11.2	65.9
Wisconsin	Jan. to Mar.	1931	11.4	67	(1)	5.2	.4	1.5	3.3	2.0	2.7	40.9	.1	1.5	2.0	51.9	116.3	(1)	(1)	(1)	(1)	(1)	(1)	119.6	(1)	7.1	(1)
		1930	11.0	68	(1)	5.2	.3	5.8	5.4	3.0	3.0	27.3	.3	1.1	3.0	52.2	117.1	(1)	(1)	(1)	(1)	(1)	(1)	107.3	(1)	8.0	(1)
		1929	12.7	78	(1)	(1)	1.3	2.2	3.5	3.1	2.6	130.8	.1	1.5	7.7	52.8	102.8	(1)	(1)	(1)	(1)	(1)	(1)	125.8	(1)	13.1	(1)
		1928	(1)	65	(1)	(1)	.7	.4	2.5	1.3	3.5	27.5	.3	1.5	4.1	56.4	(1)	(1)	(1)	(1)	(1)	(1)	(1)	93.4	(1)	10.6	(1)

[1] Not available.
[2] No deaths.
[3] Exclusive of New York City.

COURT DECISION RELATING TO PUBLIC HEALTH

Action held to lie against city for negligent removal of scarlet fever pay patient from public isolation hospital.—(Maine Supreme Judicial Court; Anderson *v.* City of Portland, 154 A. 572; decided Apr. 28, 1931.) An action was brought against the city of Portland by an administratrix to recover for damages alleged to have been sustained because of the premature removal of decedent from the municipal isolation hospital. The declaration, in substance, alleged that the city owned and maintained, chiefly as an activity for the public benefit, a hospital for the care of persons afflicted with communicable diseases and that incidentally persons were also received as private patients for gain; that the deceased, who had scarlet fever, was taken to such hospital and, for remuneration, cared for as a private patient; that two days later the defendant refused to treat the deceased any longer and sent him to his home; and that the deceased, as a result of the exposure and exertion to which he was subjected, suffered pain and incurred expense until his death, which occurred two weeks after his removal from the hospital.

The defendant city, proceeding upon the theory that, in caring for patients in the isolation hospital, it was exercising a governmental function and was, therefore, not liable for the negligence of its officers and agents, demurred to the declaration, but the supreme court held that the declaration stated a cause of action, saying:

> But the declaration sets out, in effect, in the particular instance, the defendant city was not discharging duties partaking of the nature of a governmental power. On the other hand, assertion is, that realm was left, and one entered, albeit casually, in which the rules which regulate the responsibility of business corporations are applicable.
>
> Herein lies the test. * * * When public use descends to private profit, even incidentally, liability attaches. * * *

DEATHS DURING WEEK ENDED JUNE 13, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended June 13, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended June 13, 1931	Corresponding week, 1930
Policies in force	75, 136, 092	75, 764, 230
Number of death claims	13, 770	14, 251
Death claims per 1,000 policies in force, annual rate	9. 6	9. 8

Deaths [1] from all causes in certain large cities of the United States during the week ended June 13, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended June 13, 1931				Corresponding week, 1930		Death rate [2] for the first 24 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,338	10.7	604	[4] 46	11.5	681	13.1	13.0
Akron	36	7.3	3	30	9.2	2	8.3	8.4
Albany [5]	36	14.5	1	20	13.5	2	15.3	16.1
Atlanta	67	12.6	6	61	14.6	13	16.0	16.7
White	39		3	48		3		
Colored	28	(6)	3	86	(6)	10	(6)	(6)
Baltimore [5]	174	11.2	17	58	10.4	5	16.0	15.1
White	122		11	48		2		
Colored	52	(6)	6	94	(6)	3	(6)	(6)
Birmingham	61	11.8	3	30	16.7	11	14.8	14.3
White	25		0	0		7		
Colored	36	(6)	3	73	(6)	4	(6)	(6)
Boston	164	10.9	16	46	12.5	17	15.7	15.8
Bridgeport	31	11.0	3	50	8.2	0	12.2	12.6
Buffalo	132	11.8	10	41	10.0	9	14.4	14.2
Cambridge	11	5.0	1	20	10.5	1	13.5	13.4
Camden	24	10.5	3	52	14.5	4	16.0	14.7
Canton	18	8.8	1	23	6.4	2	11.2	11.1
Chicago [5]	631	9.5	51	45	10.4	58	11.4	11.4
Cincinnati	101	11.5	6	36	12.4	5	16.9	16.5
Cleveland	196	11.2	14	41	10.6	11	12.1	12.2
Columbus	60	10.6	3	29	14.3	7	14.9	17.6
Dallas	57	10.9	8		13.3	6	12.2	12.1
White	46		7			4		
Colored	11	(6)	1		(6)	2	(6)	(6)
Dayton	53	13.4	1	14	8.3	2	13.0	10.4
Denver	67	12.0	3	29	12.6	4	15.0	15.2
Des Moines	19	6.9	4	70	13.1	2	11.5	12.7
Detroit	242	7.6	26	41	9.6	37	9.2	10.4
Duluth	22	11.3	1	25	16.9	1	11.3	11.8
El Paso	39	19.4	3		15.7	7	17.3	18.5
Erie	23	10.2	4	75	11.7	3	11.4	11.5
Fall River [5, 7]	26	11.8	2	45	8.6	1	13.4	13.6
Flint	25	7.9	2	26	6.6	3	8.0	10.1
Fort Worth	25	7.8	1		12.7	5	12.0	11.7
White	22		1			4		
Colored	3	(6)	0		(6)	1	(6)	(6)
Grand Rapids	30	9.1	3	44	8.0	2	9.8	11.3
Houston	73	12.3	10		15.0	15	11.6	12.8
White	54		10			10		
Colored	19	(6)	0		(6)	5	(6)	(6)
Indianapolis	83	11.7	12	99	15.3	4	14.6	15.5
White	71		12	113		3		
Colored	12	(6)	0	0	(6)	1	(6)	(6)
Jersey City	63	10.3	8	71	10.2	6	12.9	12.6
Kansas City, Kans.	27	11.5	1	21	10.7	3	14.3	11.8
White	21		1	25		2		
Colored	6	(6)	0	0	(6)	1	(6)	(6)
Kansas City, Mo.	85	10.8	5	38	11.7	6	14.4	13.7
Knoxville	28	13.4	3	64	8.8	1	13.8	14.8
White	17		3	71		0		
Colored	11	(6)	0	0	(6)	1	(6)	(6)
Long Beach	31	10.6	1	24	9.1	0	10.5	10.3
Los Angeles	300	11.9	22	64	10.5	20	11.4	11.6
Louisville	76	12.9	1	9	10.5	5	15.6	14.2
White	58		1	10		4		
Colored	18	(6)	0	0	(6)	1	(6)	(6)
Lowell [7]	25	12.9	1	25	9.8	3	13.4	14.9
Lynn	12	6.1	2	52	7.6	3	11.3	11.8
Memphis	66	13.3	4	42	16.4	7	17.3	18.0
White	35		2	33		3		
Colored	31	(6)	2	58	(6)	4	(6)	(6)
Miami	18	8.3	0	0	8.9	2	13.2	12.2
White	13		0	0		1		
Colored	5	(6)	0	0	(6)	1	(6)	(6)

See footnotes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended June 13, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930*—Continued

City	Week ended June 13, 1931				Corresponding week, 1930		Death rate [2] for the first 24 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	98	8.7	12	52	10.6	16	10.1	10.5
Minneapolis	97	10 7	6	39	11.5	7	11.9	11.2
Nashville	52	17.4	3	45	12 5	4	17.5	16.5
White	30	--------	2	40	--------	1	--------	--------
Colored	22	(6)	1	59	(6)	3	(6)	(6)
New Bedford [7]	18	8.3	3	80	10.7	1	13 4	1.2
New Haven	32	10.3	2	38	11.5	5	12.8	14.5
New Orleans	139	15.5	16	88	16.4	9	18.1	18.8
White	71	--------	9	74	--------	6	--------	--------
Colored	68	(6)	7	114	(6)	3	(6)	(6)
New York	1,320	9.7	111	46	10.9	133	12.5	12.0
Bronx borough	189	7.4	16	36	7.9	19	9.1	8.6
Brooklyn borough	450	8.9	46	49	10.1	45	11.5	11.0
Manhattan borough	488	14.0	32	55	16.5	53	19.2	17.9
Queens borough	151	6.8	12	33	6.6	16	8.1	7.7
Richmond borough	42	13.4	5	90	13.7	0	14.4	15.1
Newark, N. J	73	8.5	6	31	10.2	8	12.9	13.6
Oakland	55	9.8	3	38	12.2	3	11.2	11.7
Oklahoma City	36	9.5	4	55	12.5	10	12.0	10.5
Omaha	70	16.8	6	67	11.4	2	14.8	13.9
Paterson	32	12.0	1	17	13.9	1	14.9	13.6
Peoria	22	10.6	2	53	11.4	3	13.1	13.2
Philadelphia	414	11.0	32	46	13.3	41	14.9	13.6
Pittsburgh	161	12.4	18	62	13.7	16	16.5	15.3
Portland, Oreg	57	9.7	2	24	10.2	7	12.4	13.1
Providence	54	11.0	2	18	10.5	2	14.3	14.7
Richmond	56	15.8	5	73	13.9	3	17.0	15.9
White	26	--------	0	0	--------	2	--------	--------
Colored	30	(6)	5	217	(6)	1	(6)	(6)
Rochester	59	9.3	9	82	10.1	4	13.1	12.6
St. Louis	204	12.8	12	40	13.0	14	16.6	14.6
St. Paul	59	11.1	0	0	12.8	5	11.4	11.0
Salt Lake City [5]	41	15.0	5	74	12.6	4	13.1	13.7
San Antonio	81	17.6	23	--------	20.3	25	16.3	18.7
San Diego	44	14.7	4	81	14.6	1	14.9	14.9
San Francisco	158	12.7	7	46	11.9	5	13.8	13.7
Schenectady	18	9.8	0	0	8.7	0	11.1	12.3
Seattle	73	10.2	5	47	8.8	5	12.4	11.5
Somerville	14	6.9	0	0	6.5	2	10.5	11.3
South Bend	21	10.1	0	0	12.4	2	8.9	9.6
Spokane	28	12.6	3	78	9.0	1	12.9	13.2
Springfield, Mass	29	9.9	3	46	9.7	2	13.5	13.6
Syracuse	41	10.0	3	36	11.7	4	12.5	13.1
Tacoma	15	7.3	1	26	14.1	1	13.5	13.1
Toledo	70	12.4	6	55	10.5	6	13.0	13.7
Trenton	20	8.4	2	35	12.7	0	18.6	17.9
Utica	28	14.3	2	52	14.8	4	15.7	16.6
Washington, D. C	136	14.4	10	55	15.6	13	17.1	16.0
White	91	--------	7	57	--------	2	--------	--------
Colored	45	(6)	3	52	(6)	11	(6)	(6)
Waterbury	17	8.8	3	90	11.5	5	10.5	10.4
Wilmington, Del. [7]	32	15.7	4	86	14.2	2	15.8	15.6
Worcester	44	11.6	1	14	9.6	4	14.0	14.5
Yonkers	24	9.0	0	0	6.5	4	9.5	8.6
Youngstown	39	11.8	1	14	10.1	2	11.0	11.0

1 Deaths of nonresidents are included. Stillbirths are excluded.
2 These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
3 Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
4 Data for 77 cities.
5 Deaths for week ended Friday.
6 For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
7 Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended June 20, 1931, and June 21, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 20, 1931, and June 21, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930
New England States:								
Maine	2	9		1	17	47	0	1
New Hampshire		1	4		14	20	0	0
Vermont					15	39	0	0
Massachusetts	47	47		1	563	878	1	3
Rhode Island	8	3			117	5	0	0
Connecticut	1	13			207	46	0	2
Middle Atlantic States:								
New York	137	111	[1] 3	[1] 8	2,075	2,025	8	16
New Jersey	34	76	5	1	711	939	1	0
Pennsylvania	55	98			1,877	1,033	7	3
East North Central States:								
Ohio	17	26	5	3	449	336	2	4
Indiana	48	13	5		258	134	4	6
Illinois	116	131	3	3	1,322	390	8	6
Michigan	27	75		4	340	802	8	12
Wisconsin	13	21	12	12	699	326	1	5
West North Central States:								
Minnesota	15	10		2	108	98	1	2
Iowa	2	6			11	63	0	1
Missouri	14	12			96	59	2	3
North Dakota	2	4			49	11	0	0
South Dakota	4	8			3	90	0	1
Nebraska	3	5			4	75	0	1
Kansas	10	4		4	117	170	0	0
South Atlantic States:								
Delware			1		53	6	0	0
Maryland [2] [3]	17	12	3	7	364	37	1	0
District of Columbia	10	2			58	65	1	1
West Virginia	7	4	1	10	240	41	1	1
North Carolina	16	11	4	5	470	54	3	4
South Carolina	9	11	163	137	155		2	3
Georgia [3]	6	2	18	4	45	56	0	2
Florida [3]	1	7			27	38	0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 9 cases; 2 cases in Maryland; 2 cases in Goergia; 2 cases in Florida; and 3 cases in Mississippi.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 20, 1931, and June 21, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930
East South Central States:								
Kentucky					92		0	2
Tennessee		6	12	6	96	47	3	11
Alabama	13	10	3	21	69	111	9	3
Mississippi [3]	3	10					1	0
West South Central States:								
Arkansas	1	3	7	8	46	24	0	0
Louisiana	25	15	4	10		7	1	1
Oklahoma [4]	3	4	7	5	14	58	0	2
Texas	17	9	14	11	18	72	1	1
Mountain States:								
Montana	1				8	21	0	0
Idaho	1	1			4	7	0	1
Wyoming		3			5	44	0	0
Colorado	3	2			69	286	0	2
New Mexico	5	13		1	43	34	0	2
Arizona	4				26	44	2	2
Utah [2]		1	2	6	5	129	0	1
Pacific States:								
Washington	5	5			98	383	0	1
Oregon	3	2	9	7	32	103	0	1
California	63	45	23	18	502	1,186	3	4

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930
New England States:								
Maine	0	0	31	14	0	0	1	1
New Hampshire	0	0	1	3	0	0	0	0
Vermont	0	0	5	5	10	0	0	0
Massachusetts	2	1	205	102	0	0	6	2
Rhode Island	0	0	27	5	0	0	1	0
Connecticut	0	0	23	44	0	0	2	1
Middle Atlantic States:								
New York	6	4	568	228	11	14	26	11
New Jersey	0	0	197	104	0	0	7	5
Pennsylvania	2	2	407	253	0	0	12	16
East North Central States:								
Ohio	0	1	169	116	23	79	7	14
Indiana	1	0	55	50	66	124	5	4
Illinois	0	0	326	247	60	53	10	17
Michigan	3	0	361	220	18	75	5	11
Wisconsin	0	0	57	90	6	80	2	4
West North Central States:								
Minnesota	1	0	40	46	6	7	3	0
Iowa	0	0	30	22	42	89	1	0
Missouri	1	0	45	65	26	20	8	3
North Dakota	1	2	6	11	3	4	3	0
South Dakota	0	0	18	2	17	24	0	0
Nebraska	0	0	7	40	18	27	0	2
Kansas	0	0	25	22	77	71	2	8
South Atlantic States:								
Delaware	0	0	1	7	0	0	0	0
Maryland [2] [3]	0	0	29	34	0	0	6	8
District of Columbia	0	0	13	4	0	0	0	1
West Virginia	0	0	23	12	0	12	2	5
North Carolina	1	4	27	9	1	9	15	34
South Carolina	5	3	2	2	5	1	36	62
Georgia [3]	0	0	21	4	0	0	17	28
Florida [3]	0	0	6	0	0	0	2	3

[2] Week ended Friday.
[3] Typhus fever: 1931, 9 cases; 2 cases in Maryland; 2 cases in Georgia; 2 cases in Florida; and 3 cases in Mississippi.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 20, 1931, and June 21, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930	Week ended June 20, 1931	Week ended June 21, 1930
East South Central States:								
Kentucky	0	0	35	13	0	3	5	8
Tennessee	0	0	8	17	1	2	14	28
Alabama	1	5	6	16	8	10	18	26
Mississippi [3]	3	0	8	4	22	10	15	28
West South Central States:								
Arkansas	0	0	6	2	14	2	10	15
Louisiana	0	27	5	24	9	0	17	30
Oklahoma [4]	2	0	6	13	43	70	5	4
Texas	1	2	16	11	20	107	32	7
Mountain States:								
Montana	1	1	9	24	3	4	5	2
Idaho	0	0	15	0	5	1	0	0
Wyoming	0	0	1	0	0	5	0	0
Colorado	0	0	12	17	33	12	1	0
New Mexico	0	0	3	1	1	9	2	3
Arizona	0	2	1	1	1	0	3	1
Utah [2]	0	0	3	8	0	0	0	1
Pacific States:								
Washington	0	0	14	14	17	23	3	5
Oregon	0	0	7	3	11	17	3	2
California	6	51	76	84	12	43	7	12

[2] Week ended Friday.
[3] Typhus fever: 1931, 9 cases in Maryland; 2 cases in Georgia; 2 cases in Florida; and 3 cases in Mississippi.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April, 1931										
Hawaii Territory	4	40	7		152		1	7	0	5
May, 1931										
Alabama	30	44	242	201	1,110	191	6	100	56	38
Colorado	2	21			894		0	136	30	3
Illinois	73	481	24	12	8,350		6	2,149	265	23
Indiana	35	81	48		4,501		0	913	541	11
Iowa	1	24			271		0	237	274	1
Maryland	7	47	39	1	4,589	2	2	287	0	24
Michigan	27	139	9	2	787		0	1,697	81	16
Minnesota	10	52	4		897		5	344	33	8
Missouri	30	160	37	12	2,419		5	1,340	212	35
New Jersey	21	166	32	1	4,190		3	1,160	6	15
New Mexico		14	5	10	424	5	0	25	8	8
New York	42	536		4	12,992		18	3,650	32	68
North Carolina	15	60	118		3,296	402	2	169	13	10
Oklahoma [1]	9	42	285	142	183	138	1	118	280	24
Pennsylvania	43	297		2	16,957	1	1	2,600	0	45
Rhode Island		20			505	1	0	226	0	2
Texas	4	97	205	533		3	1	147		37
West Virginia	3	33	132		646		1	190	27	27
Wisconsin	9	65	88		3,442		3	624	50	4

[1] Exclusive of Oklahoma City and Tulsa.

April, 1931	Cases
Hawaii Territory:	
Chicken pox	86
Conjunctivitis, follicular	76
Dysentery (amebic)	1
Hookworm disease	1
Impetigo contagiosa	2
Leprosy	9
Mumps	58
Tetanus	3
Trachoma	4

May, 1931	Cases
Anthrax:	
New Jersey	3
New York	1
Pennsylvania	2
Chicken pox:	
Alabama	148
Colorado	249
Illinois	1,402
Indiana	364
Iowa	186
Maryland	330
Michigan	1,439
Minnesota	1,032
Missouri	305
New Jersey	1,827
New Mexico	85
New York	2,716
North Carolina	445
Oklahoma [1]	208
Pennsylvania	2,458
Rhode Island	76
West Virginia	284
Wisconsin	1,941
Conjunctivitis:	
New Mexico	4
Dengue:	
Alabama	1
Diarrhea:	
Maryland	10
Dysentery:	
Illinois (amebic)	3
Illinois (bacillary)	4
Maryland	2
Minnesota	11
Minnesota (amebic)	1
New Jersey	1
New York	6
Oklahoma [1]	4
German measles:	
Colorado	2
Illinois	205
Iowa	7
Maryland	306
New Jersey	243
New York	2,240
North Carolina	1,052
Pennsylvania	1,202
Rhode Island	39
Wisconsin	826
Impetigo contagiosa:	
Colorado	1
Illinois	4
Maryland	2
Lead poisoning:	
Illinois	1
New Jersey	2
Leprosy:	
Illinois	1
Pennsylvania	1
Lethargic encephalitis:	
Alabama	4
Illinois	5
Indiana	1
Iowa	1
Michigan	7
New Jersey	3
New York	13
Pennsylvania	13
Wisconsin	4
Mumps:	
Alabama	102
Colorado	193
Illinois	1,060
Indiana	205
Iowa	105
Maryland	313
Michigan	812
Missouri	198
New Jersey	296
New Mexico	65
New York	1,744
Oklahoma [1]	31
Pennsylvania	1,778
Rhode Island	257
Wisconsin	4,544
Ophthalmia neonatorum:	
Illinois	10
Indiana	2
Minnesota	1
Missouri	3
New York	4
Pennsylvania	24
Wisconsin	2
Paratyphoid fever:	
Illinois	2
New York	9
North Carolina	1
Texas	2
Puerperal septicemia:	
Illinois	4
New York	32
Pennsylvania	27
Rabies in animals:	
Illinois	2
Maryland	5
Missouri	10
New York	2
Rhode Island	3
Rabies in man:	
Indiana	1
Rocky Mountain spotted or tick fever:	
Colorado	3
Scabies:	
Maryland	1
Oklahoma [1]	1
Septic sore throat:	
Colorado	1
Illinois	3
Maryland	7

[1] Exclusive of Oklahoma City and Tulsa.

Septic sore throat—Continued.	Cases
Michigan	38
Missouri	5
New York	94
North Carolina	23
Oklahoma [1]	27
Tetanus:	
Illinois	2
Indiana	2
Maryland	3
Missouri	1
New Jersey	3
New York	2
Oklahoma [1]	1
Pennsylvania	6
Tetanus neonatorum:	
Maryland	1
Trachoma:	
Illinois	5
Indiana	1
Missouri	61
Oklahoma [1]	6
Pennsylvania	6
Wisconsin	2
Trichinosis:	
New York	10
Tularæmia:	
Illinois	1
Iowa	[2] 1
Missouri	1
New York	1
Typhus fever:	
Alabama	1
Undulant fever:	
Alabama	3
Illinois	25
Indiana	4

Undulant fever—Continued.	Cases
Iowa	3
Maryland	2
Michigan	1
Minnesota	6
Missouri	10
New Jersey	2
New York	12
Oklahoma [1]	1
Pennsylvania	3
Wisconsin	6
Vincent's angina:	
Colorado	1
Illinois	3
Maryland	12
New York	82
Oklahoma [1]	1
Whooping cough:	
Alabama	92
Colorado	324
Illinois	815
Indiana	344
Iowa	108
Maryland	258
Michigan	1,087
Minnesota	256
Missouri	300
New Jersey	933
New Mexico	31
New York	1,920
North Carolina	846
Oklahoma [1]	60
Pennsylvania	853
Rhode Island	36
West Virginia	274
Wisconsin	609

[1] Exclusive of Oklahoma City and Tulsa.

[2] Delayed report; case occurred in October.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,465,000. The estimated population of the 90 cities reporting deaths is more than 31,925,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended June 13, 1931, and June 14, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	729	900	
97 cities	345	494	688
Measles:			
45 States	14,989	13,103	
97 cities	5,625	5,139	
Meningococcus meningitis:			
46 States	74	118	
97 cities	34	40	
Poliomyelitis:			
46 States	38	70	
Scarlet fever:			
46 States	3,574	2,631	
97 cities	1,723	1,183	980

Weeks ended June 13, 1931, and June 14, 1930—Continued

	1931	1930	Estimated expectancy
Cases reported—Continued			
Smallpox:			
46 States	790	1,050	----------
97 cities	67	90	48
Typhoid fever:			
46 States	285	407	----------
97 cities	48	57	45
Deaths reported			
Influenza and pneumonia:			
90 cities	484	535	----------
Smallpox:			
90 cities	0	0	----------

City reports for week ended June 13, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	10	1	0	----------	0	0	5	2
New Hampshire:								
Concord	0	0	0	----------	0	4	0	0
Manchester	0	0	0	----------	0	0	0	0
Vermont:								
Barre	----------	0	----------	----------	----------	----------	----------	----------
Massachusetts:								
Boston	77	28	6	----------	0	35	7	10
Fall River	0	2	1	----------	0	23	8	2
Springfield	4	2	0	----------	0	18	18	1
Worcester	25	3	4	----------	0	1	14	4
Rhode Island:								
Pawtucket	2	0	0	----------	0	2	4	1
Providence	3	5	4	----------	0	90	19	1
Connecticut:								
Bridgeport	0	5	2	1	0	8	1	1
Hartford	4	4	0	1	0	9	2	2
New Haven	35	0	0	----------	0	59	27	1
MIDDLE ATLANTIC								
New York:								
Buffalo	21	8	11	----------	1	126	39	17
New York	307	223	83	7	6	1,131	73	121
Rochester	14	5	4	----------	0	154	12	2
Syracuse	21	2	2	----------	0	31	4	1
New Jersey:								
Camden	4	6	1	----------	0	0	3	2
Newark	61	12	13	5	0	18	6	3
Trenton	1	2	0	----------	0	5	9	0
Pennsylvania:								
Philadelphia	110	48	7	2	1	316	33	30
Pittsburgh	54	14	2	1	1	92	57	19
Reading	10	1	0	----------	1	2	4	1

City reports for week ended June 13, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	8	5	1		0	60	10	6
Cleveland	165	22	13	6	1	404	282	14
Columbus	39	3	1	2	2	10	38	2
Toledo	60	4	2	1	1	16	11	1
Indiana:								
Fort Wayne	5	1	5		0	5	0	2
Indianapolis	28	2	1		0	140	19	12
South Bend	1	1	0		0	10	0	1
Terre Haute	0	0	0		0	13	0	1
Illinois:								
Chicago	217	81	71	10	1	901	62	42
Springfield	15	1	0		0	11	3	1
Michigan:								
Detroit	131	38	10		2	62	50	15
Flint	46	1	1		0	1	9	2
Grand Rapids	2	1	0		0	49	0	0
Wisconsin:								
Kenosha	2	0	0		0	2	115	0
Madison	6	0	0			2	51	
Milwaukee	207	10	2		0	470	350	1
Racine	7	0	1		0	2	28	0
Superior	7	0	0		0	1	1	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	25	0	0		1	1	3	1
Minneapolis	98	11	4		0	68	64	8
St. Paul	83	6	6	1	1	45	5	2
Iowa:								
Davenport	4	0	0			0	0	
Des Moines	0	0	0			0	0	
Sioux City	10	0	1			2	6	
Waterloo	1	0	1			0	0	
Missouri:								
Kansas City	6	2	3		0	91	2	5
St. Joseph	1	0	5		0	8	0	3
St. Louis	19	27	5			6	4	1
North Dakota:								
Fargo	6	0	0		0	6	4	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	4	0	0			3	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	17	2	5		0	0	11	4
Kansas:								
Topeka	0	0	1		0	0	37	0
Wichita	2	1	1		0	7	0	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	1	2		0	13	2	0
Maryland:								
Baltimore	49	17	9	1	0	257	48	16
Cumberland	0	0	0		0	1	0	0
Frederick	0	0	0		0	7	1	0
District of Columbia:								
Washington	16	8	11		0	83	0	5
Virginia:								
Lynchburg	8	1	0		0	0	0	1
Norfolk	0	0	4		0	19	0	6
Richmond	0	1	2		0	45	0	3
Roanoke	3	0	0		1	10	2	0
West Virginia:								
Charleston	2	0	0		0	1	0	0
Wheeling	11	0	0		0	1	0	0
North Carolina:								
Raleigh	0	0	1		0	47	0	0
Wilmington	3	0	0		0	2	0	2
Winston-Salem	3	0	0		0	70	9	1

City reports for week ended June 13, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
SOUTH ATLANTIC—con.								
South Carolina:								
Charleston	0	0	0	31	0	3	0	4
Columbia	0	0	0		0	0	2	6
Greenville	0	0	0		0	0	0	0
Georgia:								
Atlanta	3	1	0		0	9	0	0
Brunswick	0	0	0		0	0	3	0
Savannah	0	0	0	8	2	5	2	0
Florida:								
Miami	1	1	2		0	33	2	0
Tampa	0	0	0		0	4	0	4
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	1		0	1	0	3
Tennessee:								
Memphis	6	1	0		0	102	3	0
Nashville	2	0	0		1	37	0	12
Alabama:								
Birmingham	1	1	0		1	1	1	7
Mobile	0	0	2		0	0	0	1
Montgomery	0	0	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	1	0	0			0	0	
Little Rock	2	0	1		0	8	0	0
Louisiana:								
New Orleans	0	6	5		0	1	0	11
Shreveport	2	0	0		0	5	2	1
Oklahoma:								
Muskogee	1	0	0			0	0	
Texas:								
Dallas	6	3	0		0	2	0	1
Fort Worth	4	1	1		0	0	0	1
Galveston	0	0	1		0	0	0	1
Houston	0	2	1		0	6	0	5
San Antonio	0	2	0		1	22	0	4
MOUNTAIN								
Montana:								
Billings	3	0	0		0	6	0	0
Great Falls	7	0	0		0	1	0	0
Helena	0	0	0		0	2	0	0
Missoula	0	0	0		0	0	0	1
Idaho:								
Boise	0	0	0		0	0	2	0
Colorado:								
Denver	24	6	4		0	57	37	4
Pueblo	0	1	0		0	12	0	1
New Mexcio:								
Albuquerque	7	0	0	1	0	2	0	1
Arizona:								
Phoenix	1	1	0		0	2	0	0
Utah:								
Salt Lake City	38	3	0		0	1	13	1
Nevada:								
Reno	0	0	0		0	2	0	1
PACIFIC								
Washington:								
Seattle	71	2	1			8	19	
Spokane	0	2	1			0	0	
Tacoma	11	2	1		0	2	4	1
Oregon:								
Portland	6	5	0		0	20	6	1
Salem	7	1	0			1	10	
California:								
Los Angeles	46	27	23	19	1	138	9	3
Sacramento	5	2	0	1	1	56	0	4
San Francisco	40	13	1	3	0	92	4	10

City reports for week ended June 13, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	2	9	0	0	0	1	0	0	0	0	28
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	6
Manchester	1	0	0	0	0	1	0	0	0	0	9
Vermont:											
Barre	1		0				0				
Massachusetts:											
Boston	60	49	0	0	0	10	1	0	0	16	164
Fall River	2	6	0	0	0	2	0	0	0	1	26
Springfield	5	7	0	0	0	1	0	0	0	8	25
Worcester	7	17	0	0	0	3	1	0	0	6	44
Rhode Island:											
Pawtucket	2	3	0	0	0	0	0	0	0	1	13
Providence	7	21	0	0	0	3	0	0	0	0	54
Connecticut:											
Bridgeport	6	4	0	0	0	1	0	0	0	1	31
Hartford	3	0	0	0	0	2	0	0	0	1	39
New Haven	3	3	0	0	0	2	0	0	0	7	32
MIDDLE ATLANTIC											
New York:											
Buffalo	20	44	0	0	0	11	0	0	0	17	127
New York	183	315	0	0	0	82	9	15	2	190	1,320
Rochester	8	65	0	0	0	0	0	0	0	9	56
Syracuse	8	17	0	0	0	0	0	0	0	19	41
New Jersey:											
Camden	5	5	0	0	0	0	0	0	0	1	24
Newark	20	30	0	1	0	10	0	0	0	83	79
Trenton	3	2	0	0	0	0	0	0	0	5	20
Pennsylvania:											
Philadelphia	80	143	0	1	0	26	2	0	0	37	414
Pittsburgh	26	88	0	0	0	8	0	0	0	48	161
Reading	3	2	0	0	0	2	0	0	0	0	19
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	12	35	2	0	0	10	1	0	0	10	101
Cleveland	31	60	0	1	0	17	1	1	0	33	196
Columbus	6	6	1	0	0	4	0	0	0	0	60
Toledo	12	11	1	0	0	6	0	0	0	22	70
Indiana:											
Fort Wayne	2	7	2	1	0	0	0	0	0	0	19
Indianapolis	10	24	6	16	0	4	0	0	0	41	
South Bend	3	0	1	0	0	1	0	0	0	2	19
Terre Haute	1	2	0	0	0	0	0	0	0	3	18
Illinois:											
Chicago	97	255	1	0	0	48	2	1	0	86	631
Springfield	2	5	1	0	0	0	0	0	0	0	27
Michigan:											
Detroit	91	193	0	1	0	24	1	3	0	152	242
Flint	11	19	2	0	0	1	0	1	0	2	25
Grand Rapids	7	11	0	1	0	0	1	0	0	6	30
Wisconsin:											
Kenosha	1	1	0	0	0	0	0	0	0	2	
Madison	2	3	0	0			0	0		1	
Milwaukee	26	15	0	0	0	5	0	1	0	49	98
Racine	2	2	0	0	0	1	0	0	0	14	10
Superior	2	1	0	0	0	1	0	0	0	0	9
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	0	0	0	0	1	0	0	0	0	22
Minneapolis	25	17	0	0	0	3	0	0	0	9	97
St. Paul	17	10	0	0	0	5	0	0	0	16	68
Iowa:											
Davenport	0	0	1	4			0	0		3	
Des Moines	5	2	2	16			0	0		0	19
Sioux City	2	1	0	1			0	0		10	
Waterloo	2	0	0	0			0	0		2	

City reports for week ended June 13, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—continued											
Missouri:											
Kansas City	9	3	0	1	0	9	0	0	0	7	85
St. Joseph	0	1	2	0	0	1	0	0	0	8	30
St. Louis	19	51	0	4	0	13	1	2	0	21	204
North Dakota:											
Fargo	1	0	0	0	0	1	0	0	0	2	10
Grand Forks	0	1	1	0	--------	-------	0	0	--------	0	--------
South Dakota:											
Aberdeen	1	0	0	1	--------	-------	0	0	--------	0	--------
Sioux Falls	0	3	1	2	--------	-------	0	0	--------	0	9
Nebraska:											
Omaha	3	4	3	7	0	6	0	0	0	1	70
Kansas:											
Topeka	1	0	0	0	0	0	0	0	0	1	5
Wichita	1	1	1	6	0	2	1	0	0	5	24
SOUTH ATLANTIC											
Delaware:											
Wilmington	3	1	0	0	0	3	0	0	0	5	32
Maryland:											
Baltimore	25	18	0	0	0	14	1	1	0	60	174
Cumberland	0	0	0	0	0	0	0	1	0	0	10
Frederick	0	0	0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	16	17	1	0	0	9	1	0	0	7	136
Virginia:											
Lynchburg	0	0	0	0	0	0	0	0	0	1	4
Norfolk	1	3	0	0	0	2	0	1	0	0	--------
Richmond	2	4	0	0	0	2	1	0	0	1	44
Roanoke	0	1	0	0	0	0	0	0	0	1	13
West Virginia:											
Charleston	0	0	0	0	0	1	0	0	0	4	11
Wheeling	1	0	0	0	0	1	1	0	0	0	13
North Carolina:											
Raleigh	0	1	1	0	0	0	0	0	0	10	12
Wilmington	0	0	0	0	0	0	0	0	0	16	10
Winston-Salem	1	2	0	0	0	1	0	0	0	14	18
South Carolina:											
Charleston	0	0	0	0	0	1	0	1	0	0	22
Columbia	0	0	0	0	0	2	1	0	0	4	27
Greenville	0	0	0	0	0	0	0	0	0	1	--------
Georgia:											
Atlanta	3	18	3	0	0	3	0	3	0	1	67
Brunswick	0	0	0	0	0	0	1	0	0	0	5
Savannah	0	0	0	0	0	2	1	1	1	1	29
Florida:											
Miami	0	0	0	0	0	2	0	0	0	0	18
Tampa	0	0	0	0	0	3	1	0	0	0	21
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	8	0	0	0	1	0	0	0	0	17
Tennessee:											
Memphis	3	10	0	3	0	6	2	2	0	28	66
Nashville	1	6	1	0	0	0	1	1	0	1	52
Alabama:											
Birmingham	1	4	2	0	0	5	1	0	0	2	61
Mobile	0	0	1	1	0	3	1	0	0	0	21
Montgomery	0	1	1	0	--------	-------	0	0	--------	1	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	--------	-------	0	0	--------	1	--------
Little Rock	1	1	0	0	0	0	1	0	0	9	1
Louisiana:											
New Orleans	5	15	0	5	0	9	3	2	2	2	139
Shreveport	0	0	0	1	0	3	1	0	0	3	30

City reports for week ended June 13, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—continued											
Oklahoma:											
Muskogee	0	0	2	1			0	0		0	
Texas:											
Dallas	2	8	2	0	0	5	0	3	0	0	57
Fort Worth	1	2	1	4	0	1	0	0	0	0	25
Galveston	0	0	0	0	0	0	0	1	1	0	16
Houston	2	1	0	1	0	9	1	1	0	0	73
San Antonio	0	1	0	0	0	3	1	0	0	0	81
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	0	0	5	5
Great Falls	1	2	0	0	0	0	0	0	0	4	7
Helena	0	0	0	0	0	0	0	0	0	0	3
Missoula	0	0	0	2	0	0	0	0	0	0	4
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	2
Colorado:											
Denver	9	8	0	0	0	4	0	0	1	26	58
Pueblo	0	0	0	0	0	1	0	0	0	10	10
New Mexico:											
Albuquerque	0	0	0	0	0	3	0	0	0	0	8
Arizona:											
Phoenix	0	0	0	0	0	2	0	0	0	0	
Utah:											
Salt Lake City	2	1	0	0	0	1	0	1	0	20	41
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	5
PACIFIC											
Washington:											
Seattle	6	12	1	0			1	0		65	
Spokane	4	0	4	11			0	0		0	
Tacoma	3	1	2	0	0	1	0	0	0	5	15
Oregon:											
Portland	3	2	7	4	0	2	0	0	0	0	57
Salem	1	0	1	1			0	0		0	
California:											
Los Angeles	25	24	5	2	0	28	2	1	0	35	300
Sacramento	2	0	1	0	0	0	0	2	2	6	20
San Francisco	16	4	1	0	0	14	1	3	0	20	172

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis: Cases	Poliomyelitis: Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	0	0	0	0	0	0	2	1
MIDDLE ATLANTIC									
New York:									
New York	3	2	2	1	0	0	1	4	1
Rochester	0	1	0	0	0	0	0	0	0
New Jersey:									
Newark	2	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	1	1	0	0	0	0	0	0	0
Pittsburgh	1	0	0	0	0	0	0	0	0

City reports for week ended June 13, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	1	0	0	0	1	0	0	0
Cleveland	1	1	0	0	0	0	0	0	0
Toledo	1	0	0	0	0	0	0	0	0
Indiana:									
Indianapolis	2	0	0	0	0	0	0	0	0
Illinois:									
Chicago	10	5	0	0	0	0	0	0	0
Springfield	1	0	0	0	0	0	0	0	0
Michigan:									
Detroit	3	0	1	0	0	0	0	0	0
Grand Rapids	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	1	0	0	0	0	0	0	0
Minneapolis	0	0	0	0	0	0	0	1	0
St. Paul	2	1	0	0	0	0	0	1	0
Missouri:									
St. Louis	1	2	0	1	0	0	0	0	0
SOUTH ATLANTIC									
Delaware:									
Wilmington	0	1	0	0	0	0	0	0	0
Maryland:									
Baltimore [1]	0	0	1	0	0	0	1	0	0
Cumberland [2]	0	0	1	1	0	0	0	0	0
Virginia:									
Richmond	0	1	0	0	0	0	0	0	0
North Carolina:									
Winston-Salem	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	4	2	0	1	0
Columbia	0	1	0	0	0	1	0	0	0
Georgia:									
Atlanta	0	0	0	0	1	1	0	0	0
Florida:									
Miami	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	2	0	0	0	0	0	0	0	0
Nashville	2	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	0	0	0	0	1	0	0	1	1
Mobile	0	0	0	0	4	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Fort Smith	0	0	0	0	9	0	0	0	0
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	2	0	0	0	3	1	0	0	0
Texas:									
Dallas	0	0	1	0	0	0	0	0	0
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	0	1	0
New Mexico:									
Albuquerque	0	0	1	0	0	0	0	0	0
Arizona:									
Phoenix	0	1	0	0	0	0	0	0	0
Utah:									
Salt Lake City	0	0	0	1	0	0	0	0	0
PACIFIC									
California:									
San Francisco	0	0	0	0	2	0	0	1	0

[1] Typhus fever; 1 case at Baltimore, Md.

[2] Nonresident.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended June 13, 1931, compared with those for a like period ended June 14, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, May 10 to June 13, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930
98 cities	63	74	62	79	59	76	67	75	[2] 54	78
New England	38	106	48	68	50	56	46	94	[2] 41	39
Middle Atlantic	58	74	63	76	58	67	74	68	55	78
East North Central	72	91	67	115	81	110	75	112	64	128
West North Central	71	74	75	72	54	77	55	52	61	60
South Atlantic	55	54	38	54	41	60	39	54	49	44
East South Central	17	36	12	24	17	36	12	12	17	12
West South Central	81	66	81	52	54	49	68	38	27	80
Mountain	61	35	61	53	52	44	191	18	35	35
Pacific	74	43	72	59	37	67	49	65	53	36

MEASLES CASE RATES

98 cities	1,403	1,255	1,372	1,159	1,114	911	1,096	934	[2] 876	815
New England	1,166	1,843	1,190	1,877	935	1,558	933	1,596	[2] 602	1,546
Middle Atlantic	1,486	1,337	1,478	1,091	1,187	940	1,101	1,021	833	1,033
East North Central	1,313	814	1,458	685	1,304	524	1,446	512	1,304	453
West North Central	1,396	831	1,098	794	641	525	817	420	448	370
South Atlantic	3,365	1,228	2,840	957	2,089	793	1,473	523	1,102	397
East South Central	1,234	359	1,234	568	1,047	335	1,140	371	820	161
West South Central	166	735	271	547	294	453	254	115	149	94
Mountain	531	6,652	618	7,119	461	5,674	870	5,665	705	3,410
Pacific	554	1,670	456	2,180	492	1,397	511	1,903	580	1,340

SCARLET FEVER CASE RATES

98 cities	389	226	367	206	306	182	310	208	[2] 268	188
New England	666	261	536	314	351	307	414	252	[2] 288	218
Middle Atlanitc	439	222	442	204	304	162	355	186	318	147
East North Central	454	308	412	227	438	264	422	293	386	301
West North Central	383	262	340	306	291	213	258	265	168	238
South Atlantic	243	172	241	164	239	126	197	170	122	158
East South Central	337	24	390	102	297	72	151	96	169	48
West South Central	108	73	85	49	51	14	41	73	88	35
Mountain	157	229	270	300	165	97	104	194	96	132
Pacific	123	128	88	97	110	71	86	93	80	97

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Barre, Vt., not included.

Summary of weekly reports from cities, May 10 to June 13, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	May 16, 1931	May 17, 1930	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930
98 cities	17	22	16	20	15	15	14	20	[2] 10	14
New England	0	0	0	0	0	0	0	0	[2] 0	0
Middle Atlantic	1	0	4	0	1	1	0	1	1	0
East North Central	23	16	15	10	11	12	16	8	12	11
West North Central	75	126	67	110	88	56	42	118	36	54
South Atlantic	6	4	6	2	24	10	18	4	0	8
East South Central	12	72	41	30	6	30	17	30	23	36
West South Central	41	21	47	10	37	14	41	21	24	21
Mountain	17	62	9	70	26	62	26	62	17	35
Pacific	25	47	12	71	12	49	33	59	25	49

TYPHOID FEVER CASE RATES

98 cities	5	8	6	7	7	7	6	8	[2] 7	9
New England	5	10	2	19	2	12	2	5	[2] 0	10
Middle Atlantic	5	7	5	4	8	3	5	6	7	8
East North Central	2	2	5	5	2	2	1	4	4	4
West North Central	6	8	10	8	4	10	10	10	4	6
South Atlantic	12	14	12	12	22	14	20	22	14	16
East South Central	17	42	17	24	12	36	17	12	17	24
West South Central	7	35	7	10	7	21	10	35	24	17
Mountain	0	0	0	0	17	9	17	0	9	9
Pacific	0	2	8	6	2	8	4	2	12	16

INFLUENZA DEATH RATES

91 cities	8	8	7	6	7	4	6	5	[2] 4	6
New England	2	0	5	5	10	0	2	0	[2] 0	2
Middle Atlantic	7	7	5	7	3	4	5	4	4	5
East North Central	5	4	5	5	5	4	2	4	4	6
West North Central	9	3	3	0	9	3	6	12	6	15
South Atlantic	16	20	4	6	18	4	14	10	6	2
East South Central	50	89	19	19	19	32	38	13	13	13
West South Central	7	4	28	7	14	4	10	11	3	25
Mountain	9	9	26	9	17	18	0	9	0	0
Pacific	7	12	0	5	5	2	7	2	5	5

PNEUMONIA DEATH RATES

91 cities	102	102	95	101	101	78	86	83	[2] 75	83
New England	113	111	72	109	111	97	120	80	[2] 60	89
Middle Atlantic	121	124	121	130	109	89	102	100	88	96
East North Central	74	67	68	79	75	53	59	58	60	66
West North Central	103	108	97	84	133	69	138	132	71	78
South Atlantic	126	170	111	110	132	90	77	102	83	80
East South Central	126	84	120	78	183	97	76	71	145	97
West South Central	114	78	97	82	128	121	86	78	79	100
Mountain	78	79	70	123	70	79	87	115	70	88
Pacific	55	47	55	35	43	52	48	32	43	57

[2] Barre, Vt., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended June 6, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended June 6, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia [1]					
New Brunswick [1]					
Quebec	1				6
Ontario	2	1	1		7
Manitoba					1
Saskatchewan				7	
Alberta [1]					
British Columbia			1		2
Total	3	1	2	7	16

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended June 13, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended June 13, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	83	Ophthalmia neonatorum	1
Diphtheria	30	Puerperal septicemia	1
Erysipelas	5	Scarlet fever	52
German measles	4	Tuberculosis	82
Measles	695	Typhoid fever	3
Mumps	16	Whooping cough	11

CZECHOSLOVAKIA

Communicable diseases—April, 1931.—During the month of April, 1931, certain communicable diseases were reported in the Republic of Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	6	1	Paratyphoid fever	13	
Cerebrospinal meningitis	21	9	Puerperal fever	48	21
Diphtheria	1, 109	83	Scarlet fever	938	35
Dysentery	10	1	Trachoma	211	
Malaria	56		Typhoid fever	250	25

YUGOSLAVIA

Communicable diseases—May, 1931.—During the month of May, 1931, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	26	2	Paratyphoid fever	6	3
Cerebrospinal meningitis	21	12	Puerperal septicemia	6	4
Diphtheria	395	46	Scarlet fever	335	44
Dysentery	17		Tetanus	36	17
Erysipelas	159	7	Typhoid fever	106	19
Leprosy	2	1	Typhus fever	14	
Measles	1,531	27			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931					June, 1931		
					14	21	28	4	11	18	25	2	9	16	23	30	6	13	20
Ceylon: Colombo	C				1											1	1		
	D															1	1		
China. Canton	C								1						2				
	D														1				
India	C	10,687	15,334	11,544	2,471	857	2,551	2,989	3,161	3,067	2,668								
	D	5,689	8,123	6,131	1,252	473	1,314	1,511	1,571	1,550	1,360								
Bombay	C		21						2										
	D		9						1										
Calcutta	C	28	121	170	80	102	129	125	95	82	62	71	72	89	49	55	64		
	D	20	86	112	49	68	69	70	55	51	26	44	39	44	34	32	57		
Karikal	C	1		9	2	1	7	2	10	8	1		10		1	1			
	D			8	2	1	7	2	5	8	1		5		1	1			
Madras	C	201	99	72	4	5	7	4	3	1	4	18	18	23	11		3		
	D	67	47	29	5	3	2		5	1	3	5	6	8	2	1			
Negapatam	D		3	3															
Rangoon	C	1														2			
	D	1	1													1			
Tuticorin	C	1	1	1															
India (French):																			
Chandernagor	C	2	1	5	2	2	2	1	3	2	1		3		1				
	D	3	1	5	2	3	1		3	2			3		1				
Pondicherry	C	31	19	100	29	25	26	20	5	3	5	11	3	8	2	4	1		
	D	21	11	34	6	5	4	3	1	3						4	1		
India (Portuguese)	C	1																	
Indo-China (see also table below):																			
Pnompenh	C		4	9					1	1							1		
	D		2	5		1					1		2				1		
Saigon and Cholon	C	9	6	4	1		1	3	2	3	7	15	25	23	34	22	18		
	D	4	3	4	2	1	1	1		3	6	13	20	18	25	13	9		
Persia: Rafsandjan	C												31						
	D												12						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931					June, 1931		
					14	21	28	4	11	18	25	2	9	16	23	30	6	13	20
Philippine Islands:[1] Iloilo	C	1	2																
	D	1	2																
Provinces— Capiz	C		59	186	29	11	4	4		3	8	18	11	3		3	4		
	D		47	146	24	10	4	3		3	8	13	11	3		1	4		
Iloilo	C	28	145	95	2	5											8	7	5
	D	22	110	65	2	2											6	5	6
Masbate	C				21														
	D				9														
Negros, Occidental	C	120	90	4															
	D	97	56	4															
Negros, Oriental	C		1																
	D		1																
Pampanga	C												1						
Samar	C	17																	
	D	9																	
Siam	C	2	3	1		4	4	2	1	1	1	13	11					1	
	D	2	1			1	1					4	3					1	
Ayudhaya District	C							1											
Bangkok	C	2	3	2		1	1	1	1		1	1	1	1	1				
	D	2	1	1		1	1				1	1			1				
Bismulok Province	C					4	4												
	D					1	1												
On vessel: S. S. Arankola, at Rangoon from Calcutta	C															1			

[1] Figures for cholera in the Philippine Islands are subject to correction.

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
				1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (French) (see also table above):															
Cambodia [1]	C	22	26	28			7	19	36	71	35	19	14		65
Cochin-China [1]	C	28	13	8			7	4	13	5	5	19	39		33

[1] Reports incomplete.

PLAGUE

Place		Dec. 14, 1930-Jan. 10, 1931	Jan. 11-Feb. 7, 1931	Feb. 8-Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931					June, 1931		
					14	21	28	4	11	18	25	2	9	16	23	30	6	13	20
Algeria:																			
Algiers	C	1	2	1				1											
	D							1											
Bone	C		1																
Constantine, vicinity of	C	50	1	1															
	D		1																
Philippeville	C	1																	
	D	1																	
Argentina:																			
Cordoba Province	C		1	2															
Entre Rios Province—Diamante	C			2															
Jujuy Province—Palpala	C		1	1															
Santa Fe	C			2															
Belgian Congo	C					2												1	
	D					2												1	
British East Africa (see also table below):																			
Tanganyika	C	2		22		8					3	15		5					
	D	2		4		1					10	11		2					
Uganda	C	67	25	15	4	7	4	4	8	3	10	14							
	D	67	24	15	4	7	4	4	8	3	9	12							
Ceylon: Colombo	C	9	8	11	1	3	3	1	1	3			1						
	D	9	6	13	1	3	2	1	1	2			1						
Plague-infected rats			2	3		3	1			1					5				
China: Amoy	C												1						
	D												1						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931					June, 1931		
					14	21	28	4	11	18	25	2	9	16	23	30	6	13	20
Dutch East Indies:																			
Batavia and West Java	C	239	180	141	18	31	23	12	19	24	20	11							
	D	238	168	128	17	28	23	12	18	23	20	10							
East Java and Madura	C		4	1	1		1	2			1								
	D		4	1	1		1	2			1								
Java and Madura	D	615	427	376	65	81	68	63	58	73	70	42	47	41					
Egypt:																			
Alexandria	C	3	1	2	1													2	3
	D																		3
Plague-infected rats		1	1	1															
Assiout	C	7	26	41	6	10	1	1	5	16	8	3	4	5	8	1	4		5
	D	1	6	11		4	1	1		11	4	2	2	4	1				
Beni-Suef	C		1								10	2	3		2				
	D		1								3		1		2				
Cairo	C							1											
Deirout	C		21	16								3	7	1		2	3		
	D		4	4								1	2	2			1		
Gharbieh	C		1															1	
	D		1															1	
Girga	C	7	1			14	37	35	31	9	4		1	1	5				
	D	2	1			2	5	17	13	3	5	1	1	1					
Kena	C						5				3				1				
	D						2				1				1				
Manfalut	C	23	30	15	3	5	9												
	D	5	6	5		2	1												
Minieh	C		2			2	1			1			5		1		3		
	D		1			1	1						2		1		1		
Port Said	C																	1	
Hawaii Territory: Hamakua—Plague-infected rats															1				

India	C	3,740	5,335	5,457	2,674	2,271	2,462	1,732	2,503	1,603	1,253								
	D	2,226	3,422	3,661	1,887	1,624	2,009	1,526	1,980	1,377	1,092								
Bassein	C	2	4	1								1			1				
	D	1	3	1								1			1				
Bombay	C		1	1	1	1	1	1	4	4	1	2	5		1	1			
	D		1	1		2	1		4	4		3	4	1	1				
Plague-infected rats		38	34	32	17	14	21	18	34	43	30	30	26	30	17	21	10		
Calcutta	C								1	1									
	D								1	1									
Madras Presidency	C	220	312	74	9	12	7		3					1					
	D	154	182	46	4	12	5		2					1					
Rangoon	C	2	2				1		1				1			1			
	D	1	1				1		1				1			1			
Plague-infected rats		2	4	8				1	1	3				1	1	2			
Indo-China (see also table below): Pnompenh	C	1	7	1													1		
	D	1	7	4	2	1	1	2	2	1	1						1		
Iraq: Baghdad	C		5	3	1	3	3	1		5	10	8	7	10	4	2	10	6	1
	D		4	2		3	1	1		2	5	1	3	4	2		1	4	1
Madagascar (see also table below): Tamatave	C	2	9																
Morocco	C	10	13																
	D	8	4																
Nigeria: Lagos	C	5	1						2	2	1								
	D	5	1						2	2	1								
Plague-infected rats		5							3	3									
Peru (see table below).																			
Senegal (see table below).																			
Siam	C		4	18	20	2			1				1						
	D		2	14	6	1			1				1						
Bangkok	C	3	8	6	20														
	D	3	8	5	6														
Nagara Rajsima	C	17	9	7			1												
	D	10	10	6															
Syria: Beirut	C	1	1	1															
Tripolitania	C		8	1	1														
	D		3																
Tunisia: Tunis	C	13	1	14		5		5	5	7		4	7		8				
	D			7				4	4	2		2	3						
Union of Socialist Soviet Republics:																			m
Gouranduz	D		28																
Transcaucasia—Karabakh	C		6																
Union of South Africa:																			
Cape Province	C								2	1									
Orange Free State	C	2	P	1	2		4	P	1	1									
	D	2		1			1		1	1									
On vessel: S. S. Marionga de Thermiotis at Avonmouth	C	1																	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
British East Africa (see also table above):							
Kenya	C	50	69	21	7	12	7
Indo-China (see also table above)	C	1			4	2	
Madagascar (see also table above):							
Ambositra Province	C	95	100	92	70		
	D	87	96	88	66		
Antsirabe Province	C	27	66	84	83		
	D	26	57	79	74		
Miarinarivo Province	C	18	28	31	19		
	D	18	26	29	19		
Moramanga Province	C	13	7	7	1		
	D	11	5	7	1		
Tananarive Province	C	178	92	145	90		
	D	172	89	139	81		
Peru	C	41	29	12			
	D	13	8	6			
Senegal:							
Baol [1]	D						3
Dakar [1]	C					2	63
	D					1	49
Louga [1]	C				14	1	5
	D				6		2
Rufisque [1]	C			2			1
Thies [1]	C	2					
	D	1					
Tivaouane [1]	C	2				4	9
	D	1					7

[1] Reports incomplete.

SMALLPOX

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13
Algeria:																		
Algiers	C	1	1	1			2			2					1			
Bone	C		1															
Constantine	C					1							1					
Arabia: Aden	C		1	1														
Belgian Congo	C	79	50															
Belgium	C			1														
Brazil: Porto Alegre (alastrim)	C		3	7	7	12	16	14	20	19	8	6	2					
	D			1				1										
British East Africa (see also table below): Tanganyika	C	84	70	91	6	2												
	D	4	5	13	1	2												

British South Africa: Southern Rhodesia	C	18	13															
Canada:																		
Alberta	C	19	7	1														
British Columbia	C	3	2	8														
Manitoba	C		1	1														
Winnipeg	C	1		1									4					
Nova Scotia	C		1				1											
Ontario	C	17	49	29	2	3	3	1	4		6	7	17	5		3		
Kingston	C	6	1	1							2	3						
North Bay	C	2		1														
Ottawa	C	2	3	1														
Sault Ste. Marie	C	1	30	2					3	1				1				
Toronto	C				1		1			4			1					
Quebec	C		2															
Saskatchewan	C		38	63	40	10	8		5	16	3	22	7	15	18	8	7	
Regina	C			1			2				2		2					
Canary Islands: Las Palmas	C						1											
China:																		
Amoy	C						1					2	2	1	1	2	1	
	D						1					1	1		1	1	1	
Canton	C			3	1	2	2	2	1	2	1				1	2		
Chungking	C	2																
Foochow	C	P	P	P		P		P	P			P						
Hong Kong	C	1	1	9			1	1		1	2					1		
	D			3			2				1		1			1		
Manchuria—																		
Harbin	C		1	4	1		1											
Kwantung—Dairen	C	1					2				1	1						
Nanking	C	P	P	P		P	P	P	P	P	P	P	P	P	P			
Shanghai—																		
Foreigners only	C	14	12	16	3	1	1	1	2	1	2	2	1	4	1	1	2	
Including natives	D	11	13	14	5	2	2	1	2	7	4	5	1		3	3	1	5
Swatow	D	5	7	13	3	6	9	8	2									
Tientsin	C		1										2					
Chosen (see table below).																		
Colombia: Cali	D												1					
Dutch East Indies:																		
Batavia and West Java	C	4	29	2	1													
	D	2	2	1														
East Java and Madura	C															1		
Finland	C														1			
France (see table below).																		
Great Britain:																		
England and Wales	C	665	958	745	171	219	226	179	177	163	212	192	186	166	111	107	83	
Bradford	C	1	4	1		1		1	1		1	4	1	3	1	3		
Leeds	C	2						1		1	1		1		1			
London	C	161	140	98	26	54	32	35	51	30	84	53	66	44	37	36	25	
London and Great Towns	C	560	693	683	117	154	166	117	142	126	162	128	139	108	84	72	57	
	D			1					1		1							
Sheffield	C		3	32	2	1	6	1	4	2	1							
Stoke-on-Trent	C		1	1														

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13
Greece (see table below).																		
Honduras:																		
Amapala	C			1														
Ocotopeque and Gracias districts	C			P														
Puerto Castilla	C	4	11	3														
Tegucigalpa	C										1							
Tela	C								1									
India	C	5,623	9,623	12,222	3,440,	1,695	3,395	3,261	3,980	3,749	3,468							
	D	1,381	2,245	2,600	655	303	655	638	807	684	680							
Bassein	C															1		
Bombay	C	2	7	6	4	1	4	1	2	2	1	3	3		6	1		
	D	2	1	3		1	2	1	1			4	1	1	1	1		
Calcutta	C	59	143	251	53	69	75	86	101	60	61	65	24	30	19	16	14	
	D	40	100	188	36	54	50	63	78	42	50	54	18	25	17	15	12	
Cochin	C	15	29	59	15	17	14		10	11	12	6	3					
	D	1		3														
Karachi	C		3	4		3		1		5		1						
	D		2				2											
Madras	C	4	16	8	6	3	9	4	12	4	1	2	1	3	3	1		
	D			1		2	1		2	1	1	1		1	5			
Moulmein	C		2															
Negapatam	C								1	1		1						
Rangoon	C			4	1	1	1		2	2	1	6	7	5		1		
	D				1							1	2	1	1	1		
Vizagapatam	C		1	8	1		1		2	2	4	2			5	1	2	
	D			2			1		1		1				1			
India (French):																		
Chandernagor	C	5	9	12	3	3	6	2	3	1	4	2	3		4			
	D	3	1	1				2	3	1	2	1	3		2			
Karikal	C	3	5	19			3			1	1	2	1	1	1	1	1	
	D	2	4	18						1		2	1	1	1	1	1	
Pondicherry Province	C	34	45	19	7		4	3	3			3	1	2	7	1	3	2
	D	32	45	19	7		4	3	3	3		3	1	2	7	1	3	2
India (Portuguese)	C	4	5	14		3	5			19	2							
	D			3		1	2			4	2							

Indo-China (see also table below):																		
Pnompenh	C	2	1		1										1		2	
	D		1												1			
Saigon and Cholon	C		6	4	4	1	1	2	1					1		1		
	D		4	1	3	1	2	2	1					1				
Iraq:																		
Baghdad	C			9							1	1			1			
Mosul Liwa	C	1	3	5														
	D			1														
Ivory Coast (see table below).																		
Japan:																		
Kobe	C			2														
Taiwan	C		1															
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D		1				1					1	1		1			1
Mexico City and surrounding territory	C	10		23	13	13	7		17	9	11	6	4	10	10	21		
	D	6	1	8	5	5	6	6	4	6	4		4	3	2	2		
Monterrey	C															1		
Torreon	C									1				1				
	D									2								
Vera Cruz	C			3		1	1			1		1	1					
Morocco (see table below).																		
Nicaragua: Porto Cabezas	C	2																
Nigeria: Lagos	C						2											
Panama Canal Zone	C		2															
Poland	C	25		1												3	1	
Portugal: Lisbon	C	72	103	40	16	15	17	4	8	18	11	19	19	14	16	18	5	
Siam	C	1	4	2							1							
	D	1																
Spain	C	P	P	P	P	P	P											
Straits Settlements	C	6	7	2			2	2	1		1							
	D	3	1	1			1		1	1								
Sudan (Anglo-Egyptian)	C	64	11	97	3	1	4					3		3		1		
	D	6	7	10		1	1									1		
Sudan (French) (see table below).																		
Syria (see table below).																		
Tunisia: Tunis	C	17	8				4											
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P			P	P	P	P	P		P	P				
Orange Free State	C		P	P			P	P	P	P	P		P	P				
Transvaal	C	P	P	P	P		P											
Upper Volta	C	4		18			3			3			1	2		85		
	D	2					1									1		
On vessel:																		
S. S. Clan Mactoggart at Suez	C			2														
S. S. Muncaster Castle at Manila from Hong Kong	C	1																
S. S. Matheran at Suez from Calcutta	C		1															
S. S. Clan Buchanan at Suez	C			2														
S. S. Rotterdam at Naples from Venice	C						1											
S. S. Clan McTavish at Manila from Chittagong	C									1								

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13
On vessel—Continued.																		
S. S. Benvenue at Sydney from Shanghai	C		1															
S. S. Clan MacBrayne at Cochin	C			1														
S. S. Chilka at Rangoon	C			1														
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C											1						
S. S. Talodi at Soakim	C													1				

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
British East Africa (see also table above):							
Kenya	C	653					
Chosen	C			1		11	
	D			1		3	
France	C			4	16		
Greece	C		4		4		
Mexico (see also table above)	D		1		3		1
Morocco	C	20	25		4	6	7
Turkey	C	65	116	63	37	1	
	D	1	9	7	6		

Place		October, 1930	November, 1930	December, 1930: 1–10	11–20	21–31	January, 1931: 1–10	11–20	21–31	February, 1931: 1–10	11–20	21–28	March, 1931: 1–10	11–20	21–31
Indo-China (see also table above)	C	258	86	38	9	14	47	48	46	95	46	27	125		139
Ivory Coast	C	4	2	9											
Sudan (French)	C	17		43		96							4		P
	D	2		16		4									
Syria: Beirut	C							1							

TYPHUS FEVER

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931					June, 1931	
						14	21	28	4	11	18	25	2	9	16	23	30	6	13
Algeria:																			
Algiers	C	2			2			3				2	1	3		1	3	4	
Constantine Department	C	2	6	31	4		1		2	2		6	1	8	3	5	6	6	
Oran	C	5		3	1							1					2	2	
Australia, Western	C		3						1					1					
Bulgaria	C	11	1	13	5				9		26	4			5	8	3		
	D								2		3				1				
Chile: Valparaiso	D						1												
China:																			
Canton	C			2		1													
Manchuria—Harbin	C	1		3	5			3				8							
Shanghai	C			2															
Tientsin	C	1								1	1								
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C	2									1								1
	D											1							
Beheira Province	C		1							3	1								
	D		1							2									
Cairo	C	1	1	1															
Port Said	C			1															
Eritrea: Asmara	C					1													
Great Britain: Scotland	C			1															
Fife County	C																1		
Glasgow	C			2															
	D			1															
Greece (see table below).																			
Guatemala.[1]																			
Iraq: Baghdad	C				5	1		1						2					
	D				1									2					
Irish Free State:																			
Cork County—Skibbereen	C																		1
Kerry County—Dingle	C													1					
Mayo County—Belmullet	C										1								

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 16–Dec. 13, 1930	Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931 14	21	28	April, 1931 4	11	18	25	May, 1931 2	9	16	23	30	June, 1931 6	13
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico (see also table below):																			
Durango	D			1															
Mexico City, including municipalities in Federal District	C	14	12	39	35	46	66	73	31	67	34	38	31	16	27	17	15		
	D	7	10	34	16	20	13	31	20	18	7	17	14	9	7	7	10		
San Luis Potosi	D	2			5	1	1	2	1	1	2					1	1		
Morocco	C	1	8	8	28	2	2	3			1		12		13	29			
	D			2	1								1		2	2			
Palestine	C	7	4	2	3	2	1	1	1	1	2		2	2	1	1			2
Panama Canal Zone—Balboa	C														1				
Paraguay: Asuncion	D			4	1	1													
Poland	C	42	63	106	189	62	58	85	82	93	176	140	129	92	81	58	67		
	D	7	3	8	19	4		7	4	8	7	6	7	6	4	5	3		
Portugal: Oporto	C	6		1															
Rumania	C	34	113	193	152	55	53	52	54	70				63					
	D	3	5	16	24	4	5	3	4	8				10					
Spain	C	1																	
	D	1																	
Syria	C														1	3			
Tunisia:																			
Sbeitla, vicinity of	C								20	2			10						
	D								7										
Sfax	C							2											
Tunis	C	28		16	18	5	2	7		2		1	10	12	9	8			64
	D													1	2				
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	1		P	P	P	P	P		P	P				
Municipality of East London	C	1	3	3				P	P										
Natal	C		P	P	P		1	P	P	P	P	P	P	P					
Orange Free State	C		P	P	P	P				P	P	P							
Transvaal	C	P	P	P	P	P		P	P	P	P	P		P	P				
Yugoslavia (see table below).																			

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Chosen: Seoul	C	1	1	1		3	4
Czechoslovakia	C	16	24	60	26		5
Greece	C	4	10	10	17	8	22
	D			2	2	1	3
Latvia	C				12		
Lithuania	C	5	6	26	3	22	32
	D	1	3	3	1	2	3
Mexico (see also table above)	D	47	47				
Turkey	C	3	2		18		
Yugoslavia	C	2	1	20	12	10	43
	D		1	2		1	5

YELLOW FEVER

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30	June 6, 1931
Brazil:																	
Bahia State	C				1	1											
Ceara State	C		1		2							2		1			1
	D		1									2		1			
Minas Geraes State	C					2			1		2	2	1		1		
	D					1					1	1	1				
Rio de Janeiro State	C					1								1	1		
	D			1	1	1											
Cambucy	C		3	2	1												
	D		3	1													
Friburgo (imported)	C		1														
Padua	C		2	1													
	D		2	1													
British Cameroon: Mamfe	C													3		1	
	D													1			

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

The PUBLIC HEALTH REPORTS are intended primarily for distribution to health officers, members of boards, or departments of health, and those directly or indirectly engaged in or connected with public health or sanitary work. Articles of general or special interest are issued as reprints from the PUBLIC HEALTH REPORTS or as supplements, and in these forms are available for general distribution to those desiring them.

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PUBLIC HEALTH REPORTS

VOL. 46 JULY 10, 1931 NO. 28

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

May 24–June 20, 1931

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized in this report. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Measles.—The rather high incidence of measles since the beginning of the current year reached its peak the latter part of April and has declined rapidly in all sections of the country. The number of cases (63,199) reported for the 4-week period ended June 20 was only about 5 per cent in excess of the number reported for the corresponding period last year. In 1929 the number of cases totaled 51,490—approximately 20 per cent less than for the current period.

The greatest number of cases of measles has been continuously reported from the States along the Atlantic coast and in the Great Lakes region. In the South Atlantic group almost four times as many cases were reported during the current period as were recorded last year at that time.

While many cases have been reported from the other sections of the country, in none of them has the number exceeded that of last year. In the West North Central group an average of 45 per cent decrease from last year's figure has been maintained during the five preceding 4-week periods of the year, and in the Mountain and Pacific group an average of 58 per cent decrease.

Poliomyelitis.—Reports from the various geographic regions indicate an increase in the occurrence of poliomyelitis over the preceding 4-week period. Each geographic group contributed to the increase, but the largest number of cases was reported from the North Atlantic and Mountain and Pacific groups. Each of these groups reported 30 of the total of 124 cases. In the former group Massachusetts reported 8 cases and New York 16; in the latter region, California reported 23.

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The number of States included for the various diseases are as follows: Typhoid fever, 47; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 45; diphtheria, 47; scarlet fever, 47; influenza, 39 States and New York City. The District of Columbia is counted as a State in these reports.

Comparing the incidence of poliomyelitis with previous experience, the number of cases was about 35 per cent less than that for the same period of last year, but was 30 per cent higher than was reported in 1929—a more nearly normal year. This period in 1930 marked the beginning of the epidemic wave of 1930–31.

While in the North Atlantic and West North Central groups the number of cases was two and five-tenths times that for last year, in the other regions, although considerable increases over the preceding 4-week period were noted, the number of cases fell considerably below last year's figures.

Typhoid fever.—Increases in typhoid fever incidence were noted in all regions of the country during the 4-week period ended June 20. Of the 1,053 cases reported, the South Atlantic group reported 283 and the South Central groups 347—about two-thirds of the total number. These numbers represent approximately 50 per cent and 40 per cent increases, respectively, over the preceding 4-week period. The other groups showed minor increases.

Typhoid fever is still maintaining its favorable low level as compared with previous years, the total number of cases being only about 88 per cent of the number reported last year and 78 per cent of the number reported in 1929.

Meningococcus meningitis.—The incidence of meningococcus meningitis continued to decline in all sections of the country during the current period. The number of cases reported (338) amounted to only 68 per cent of the number reported in 1930 for the same period and to only 37 per cent of the number in 1929.

A decrease of 68 per cent from the preceding 4-week period was noted in the number of cases occurring in the South Atlantic States during the current period, but the number of cases (41) was still 32 per cent in excess of last year's figure. This is the only region of the country not participating in the favorable comparison of the incidence of this disease with last year.

Scarlet fever.—A decrease in scarlet fever of approximately 6,000 cases occurred during the 4-week period ended June 20 as compared with the preceding 4-week period. Comparison, however, with last year's data indicates that the disease is still considerably more prevalent than in that year. For all reporting regions the number of cases totaled 15,299, as compared with 11,424 cases reported for this period last year.

The North Atlantic and East North Central groups appear to be mostly responsible for the excess in this disease which has prevailed since the first of the year. During the current period the excess over last year in the first named group was 53 per cent and in the second about 43 per cent. Other regions compared more favorably.

Diphtheria.—The steady decline in diphtheria which has prevailed throughout the year continued through the current period. The number of cases reported (3,079) represented a decrease of approximately 17 per cent from last year's figure and of 40 per cent from the number reported in 1929 for the corresponding period.

Smallpox.—For smallpox the comparison with previous years was very favorable. The number of cases reported was 3,001, as compared with 4,042 last year and 3,775 in 1929 for the corresponding period. All regions participated in the decline except the North Atlantic and South Central groups. In the North Atlantic group the number of cases was two and four-tenths times the number reported last year and in the South Central groups was one and four-tenths times last year's figure. In the other groups decreases ranged from 22 per cent in the South Atlantic group to 62 per cent in the East North Central group.

Influenza.—The incidence of influenza declined approximately 55 per cent during the 4-week period ended June 20. The number of cases, however (1,887), was still 24 per cent in excess of the number occurring at this time last year, and slightly exceeded that for 1929. As compared with last year, the South Atlantic and Mountain and Pacific groups showed 40 per cent and 44 per cent increases, respectively, while the incidence for the other geographic divisions was approximately the same for the two years.

Mortality, all causes.—The mortality from all causes in a group of large cities, as summarized by the Bureau of the Census, showed an average rate of 11.0 per thousand population (annual basis) during the 4-week period ended June 20, which was not only the lowest rate for the current year but was below any rate for the corresponding period in the preceding five years.

SOME ESSENTIAL CONSIDERATIONS IN CONNECTION WITH THE RURAL HEALTH PROGRAM[1]

By W. F. Draper, *Assistant Surgeon General, United States Public Health Service*

On February 6, 1931, an appropriation of $2,000,000 became available to the Public Health Service for cooperation with the States in the drought-stricken areas in studies of and demonstration work in rural sanitation. The appropriation is for use from the date of passage of the act until June 30, 1932. The provisions of the act are similar to those of the regular rural sanitation act with the following exceptions:

1. The funds are limited to the drought-stricken areas.

[1] Presented at the Twenty-ninth Annual Conference of State and Territorial Health Officers with the United States Public Health Service, April 27, 1931.

2. It is not required that at least 50 per cent of the total cost of any cooperative project shall be defrayed from State and local sources.

3. The appropriation is also available for the purchase and distribution of medical supplies.

4. It is strictly an emergency appropriation to meet emergency conditions resulting from the unprecedented drought and terminates upon a specific date.

5. It is to be expended in accordance with regulations prescribed by the Public Health Service.

6. A report of the extent and circumstances of the several cooperative projects is to be made to Congress at the beginning of each regular session.

Telegraphic dispatches were immediately issued by the Surgeon General to all of the State health officers concerned, calling for a conference in Memphis on February 10, 1931, to consider plans for carrying out the provisions of the act. Twenty-two States were considered as being included in the drought-stricken areas, of which 20 were represented at the conference. The conference approved plans submitted by the Public Health Service for cooperation with State and local health authorities under the provisions of the act (see Appendix).

In addition the following resolutions were passed by the conference:

1. *Resolved*, That the public health officials of the States of the drought-stricken areas of the United States in assembly in the city of Memphis ask the Surgeon General of the Public Health Service, immediately upon his return to Washington, to confer with and urge the American Red Cross to continue to furnish necessary medicines, also surgical supplies, to the indigent sick in the areas as an emergency measure. It is the sense of the body that this great international relief organization, designated as an official agency by the Congress, has always met the actual needs everywhere and has never failed to afford the basic elements of disaster relief, whether cyclone, flood, fire or famine. The first essentials are considered to be necessary food, medicines, and clothes for the needy. Nothing less can be expected of the American Red Cross by the American people.

2. That it is the sense of this body that the distribution of medical supplies referred to in the bill is construed as meaning biological supplies used in the prevention and control of disease as a public health measure.

The first cooperative budgets under this appropriation became effective March 1, 1931, and extend to June 30, 1931, at which time new budgets will be put in operation for the year July 1, 1931, to June 30, 1932.

The States in which cooperative projects are being conducted for the period ending June 30, 1931, together with the allocations to each State under approved budgets, with other essential data, are as follows:

Authorizations in drought-stricken area

State	Allocation	Number of counties	Number of health districts	Number of towns	Mobile units	Central administrations	Biologics
Alabama	$21,618.33	31				1	$1,500.00
Arkansas	73,830.18	69				2	7,685.00
Georgia	16,887.00	3			3	2	1,657.00
Illinois	19,050.00				2	1	0
Indiana	2,876.50	5		1			626.50
Kentucky	45,163.91	34				1	2,200.00
Louisiana	36,851.08	[1] 20				2	7,174.00
Mississippi	22,338.30	15				2	3,333.33
Missouri	39,600.00		5				1,000.00
Montana	3,325.00	4				1	1,000.00
Oklahoma	27,297.00	7				2	8,491.00
Pennsylvania	31,580 04				1	2	0
Tennessee	62,455.07	22	5		1		1,000.00
Texas	24,514.75	3	15		1	2	2,319.75
Virginia	19,935.59	20	2		1	2	4,985.00
West Virginia	31,575.00	33	4			1	0
Total	478,897.75	266	31	1	9	21	43,001.58

[1] Parishes.

It was the opinion of the conference that the character and extent of future cooperative county health work, as far as the Federal Government is concerned, would be determined largely by the manner in which this appropriation was administered, the uses to which it was put, and the results accomplished. It is with deep gratitude and satisfaction that I am able to report to this conference to-day that, without exception, every State which has requested cooperation under the provisions of this act has made an earnest and successful endeavor to comply with the principles which were adopted at the Memphis meeting, and in spirit and in practice to organize the work upon a rational, conservative basis, which may be relied upon to fulfill the hopes and ambitions of those concerned with the making and administration of the appropriation and to merit their confidence in future undertakings.

On our part we have devoted our best efforts to serving the States promptly and effectively and to meeting their needs as completely as possible under the limitations of the regulations which apply to all agencies of the Federal Government. If we have seemed at times to be unduly insistent upon exactness of detail regarding nominations, dates of appointment, vouchers, pay rolls, and the like, it is only because it is required of us and is essential for the accomplishment of our common purpose. If we have questioned or failed to approve certain supplies which have been requested, it is because we were lacking sufficient evidence to enable us to prove their justification and because it seemed advisable for the sake of all concerned not to force the issue. We are confident that any of you in our position would probably have done the same.

During the fiscal year beginning July 1, 1931, we shall have available for cooperative work in the drought-stricken area approximately

$1,500,000, or such part thereof as may be necessary. For the counties not included in this area, there will be available the regular rural sanitation appropriation of $338,000. Estimates and budgets for proposed projects under each of these appropriations will be requested early in May for the coming fiscal year, and those approved will become effective July 1, 1931. The possible total, therefore, which the Public Health Service may have invested in cooperative county health work during the year July 1, 1931, to June 30, 1932, is approximately $1,838,000.

While this is gratifying and stimulating in some respects, there are nevertheless future problems which should begin to receive serious consideration right now. As already stated, the appropriation for the drought-stricken area is an emergency measure and will cease on June 30, 1932. It is essential, therefore, that the cooperative projects should be planned in such a manner that work other than that made necessary by the drought may continue without embarrassment, and that personnel may not experience undue hardship when the emergency appropriation ceases.

The emergency funds will suffice to meet the needs during the coming fiscal year in several hundred counties. Such portion of the regular rural sanitation appropriation as might, under ordinary circumstances, be used in some of these counties will therefore be available for use in other counties. However, when the emergency appropriation is exhausted, a number of the counties which have been aided by it will again be eligible for cooperative projects under the regular appropriation. This will necessitate a withdrawal or curtailment of funds in a number of the counties in which the regular appropriation will be invested during the year beginning July 1, 1931. The plans for these counties in 1932 should therefore provide for a replacement from State or local sources of the Federal funds to be withdrawn, or for a revised program to meet the changes.

It is suggested also that the policy of the Rockefeller Foundation in regard to future cooperation in counties now receiving assistance through emergency funds should be determined as far in advance as possible.

FUTURE PLANS REGARDING COOPERATIVE COUNTY HEALTH WORK

The failure, in the last Congress, of legislation providing for a permanent plan of cooperative county health work is now ancient history. I do not know at this time what action regarding the introduction of new or old legislation at the next session of Congress is contemplated by the proponents of the maternity and infancy measure and the proponents of the measure in behalf of cooperative county health work. I wish, however, to outline briefly certain possibilities in connection with plans of future work which, judging

from my own knowledge and experience, might prove worth while. I believe that there is urgent need for the further development in the Public Health Service of the following three lines of cooperative service to State and local health agencies:

1. An adequate consultation and advisory service.
2. A service to develop better trained and better qualified public health personnel in official health agencies, national, State, and local.
3. The accretion by means of studies, surveys, and experimental demonstrations of additional knowledge and improved methods which may receive practical application and thereby increase the effectiveness of public health administration generally and produce more satisfactory results.

Time does not permit, nor is it necessary for understanding by the members of this conference, to present a detailed description of the significance of such a program in relation to State and local health activities.

As regards the consultation and advisory service, there can be no doubt of the value of professional advice and assistance to communities and States by competent experts in the several special phases of public health. Such service is now being organized on a modest scale in connection with the drought relief work, and its value and possibilities will be readily apparent to those of you to whom it is possible to extend it. As the first new member of this developing consultant staff we have been most fortunate in securing Dr. Estella Ford Warner, who is acting as consultant to State and local communities in the child hygiene work in our cooperative county health projects. Doctor Warner has thus far had time to visit only Alabama, but Doctor Baker will doubtless be glad to give any of you who care to make inquiry of him his appraisal of the value and desirability of this type of service. At a later session of this conference Doctor Warner will present an outline of her work. Should the Public Health Service be made responsible for a permanent program of county health work in the future, it would be disposed to give serious consideration to the maintenance of a definite consultation service on all public health problems that might arise in which expert knowledge and broad experience were required for solution.

Closely related to this consultation service would be additional executive personnel from the Public Health Service to assist in the development of programs of public health work in underdeveloped States and localities in order that their citizens and their children might have the advantages of health protection and health promotion similar to such advantages enjoyed by those in the better developed and more prosperous States and localities. Some of you have already been provided with such personnel and know the desirability of extending this service. At the present time we are totally unable to

meet your requests for its extension, which in itself may be considered another part of a possible future program.

The need for better qualified and better trained personnel in all departments is only too well known to you. In a future program consideration might be given to cooperating with State and local communities by the temporary assignment of Public Health Service personnel to act as substitute health officers for a sufficient period to enable the permanent public health officers to accept scholarships in the accredited schools of public health. This would have the double advantage of adding greatly to the public health training and experience of both the permanent official and the substitute, and in the course of a few years would contribute vastly to the elevation of the public health standards of this country.

Little need be said at this time of the value in a future program of additional studies and investigations for the purpose of extending scientific information and perfecting more effective methods for the application of present knowledge for the prevention and control of disease. Such work on a much more nearly adequate scale must of necessity be included in any well-conceived plan of cooperative county health work on the part of the Federal Government.

Appendix

PRINCIPLES OF ADMINISTRATION OF STUDIES OF RURAL SANITATION IN DROUGHT-STRICKEN AREAS

The deficiency act approved February 6, 1931, contains the following provision:

"For special studies of, and demonstration work in, rural sanitation, including the purchase and distribution of medical supplies, in the drought-stricken areas, and including personal services, fiscal years 1931 and 1932, $2,000,000: *Provided*, That no part of this appropriation shall be available for demonstration work in rural sanitation unless the State, county, or municipality affected agrees to pay such proportion of the expenses of such demonstration work as shall be required in regulations to be prescribed by the Public Health Service, in which due consideration shall be given to State and local economic conditions and human needs, the extent and circumstances of such cooperation in each case to be reported to Congress at the beginning of each regular session."

The general plan to be followed by the Public Health Service in cooperation with State and local health authorities under the provisions of this act are as follows:

1. Supplementing existing county or local health departments—
   (a) By assuming obligations of local authorities in county or local health department budgets when local funds are lacking on account of inability to collect taxes, bank failures, or other equally justifiable causes.
   (b) By employing additional personnel to meet emergency needs as a temporary measure only.

2. Aiding in the support of county health units in counties which have no such existing organization. Such aid will be based upon the following conditions:
   (a) That at least one-half of the expense be borne by the local authorities.
   (b) Or that at least one-fourth of the expense be borne by the local authorities and one-fourth by the State.
   (c) In cases in which the county can contribute only less than the amounts mentioned above, but which require public health personnel for

emergency work, the Public Health Service will assist the State health department in providing temporary personnel. Such personnel should not be construed as constituting a county health department. It is temporary personnel supplied through the State health department for the limited period of the emergency, and will be withdrawn when the emergency ends.

3. Aiding in the support of mobile health units—

These units will be considered to be a part of the State Central Administration and will be supported by State funds to the greatest extent possible. They are for use in providing temporary health services in local communities which require such services.

4. By aiding in the support of individual county nurses and sanitary inspectors:

Such personnel may be utilized in counties which require their services and in which organized health departments can not at present be maintained. The salaries will be defrayed as largely as possible from State and local funds. Such personnel should be regarded as State personnel and strictly of a temporary character.

5. By supplementing State boards of health by supervisory personnel required for emergency work (assistant directors of rural health work, assistant directors of child hygiene, assistant sanitary engineers, and the like).

6. By aiding in supplying biologic products:

The Public Health Service will assist when necessary in providing biologic products for use in preventing the spread of communicable diseases. The cost of such products will be defrayed as largely as possible from State and local funds. Arrangements regarding biologic products will be made by the Public Health Service through the State health departments, and not through local authorities.

EXPERIMENTS WITH CERTAIN FUMIGANTS USED FOR THE DESTRUCTION OF COCKROACHES

By J. R. Ridlon, *Surgeon, United States Public Health Service*

The officers of the United States Public Health Service fumigate nearly 4,000 vessels each year in connection with the enforcement of the Federal maritime quarantine regulations. The purpose of these fumigations is the destruction of rats on shipboard in order to prevent the spread of bubonic plague. It is also important, for several reasons, that vermin, including cockroaches, be killed by these fumigations. It is customary for ships' officers and agents to judge the efficiency of fumigation by the success shown in the destruction of cockroaches. While such insects are ordinarily of little or no quarantine importance, evidence is available that they may be of some sanitary importance on account of their contamination of foodstuffs and for other reasons.

Cockroaches are extremely common on many vessels, especially during warm weather and on those vessels running to the warmer climates. These insects particularly frequent the galleys, pantries, and provision storerooms. They are especially likely to be found in warm places. The smaller species are able to squeeze into the narrow cracks and crevices behind woodwork, such as ceilings, moldings,

closets, and in cupboards. It is very difficult to eradicate them by the use of the ordinary sprays and powders found on the market.

The roaches belong to a large family, the Blattidæ. Three species have been noted on vessels at the port of San Francisco; namely, *Blattella germanica*, *Blatta orientalis*, and *Periplaneta americana*.

Blattella germanica is by far the most common species. It is the smallest of the three species; the males measure about 13 millimeters and the females 11 millimeters in length. The females carry the eggs in tough capsules attached to their bodies. These capsules may be deposited before the eggs hatch or the eggs may hatch while the capsule is still attached. It is reported that under favorable conditions the young pass through several molts and attain full growth in about six months. This species is often called the Croton bug.

The *Blatta orientalis* is not uncommon on vessels coming from Mexican and Central American ports. Both the males and females are from 20 to 23 millimeters in length and are dark brown in color. The egg capsule usually contains 16 eggs. It is said that full development may take three to four years.

The *Periplaneta americana* is the largest of the three, measuring 28 to 32 millimeters both in male and female. These are only occasionally seen in vessels from warm climates. The female lays an egg capsule containing about 30 eggs. It is said that the egg pod is always deposited before the eggs hatch.

Fox (1) says:

> Roaches are a sanitary menace because they are potential carriers of infection mechanically by means of their feet and bodies. They soil everything they come in contact with, leaving a nauseous roachy odor.

Pryor (2) says:

> As cockroaches crawl almost everywhere and grovel in filth, they readily may spread filth and sputum-borne diseases by infecting food and water * * *. Aboard ship they frequently destroy considerable foodstuff, and if permitted to develop in numbers, ruin foods to which they have had access. The disagreeable roachy odor comes from a dark fluid exuded from the mouth and also from the excrement.

Toda (3) fed cockroaches (*B. germanica*) on cholera cultures and recovered viable vibrios from their feces or intestines in 15 per cent of 94 insects examined. He states that the feces may contain viable vibrios for 24 to 48 or even 72 hours after the infective feed. He suggests the possibility that the cockroach might act as a vector of cholera vibrios under conditions prevailing on shipboard.

Barber (4) reports that cockroaches which have fed on human cholera feces may discharge viable vibrios for at least two days after the insects have fed, and in reduced numbers even 79 hours after ingestion. In Barber's opinion cockroaches may convey infection to human food either through infected vomit or feces; and in human

food so infected, vibrios may survive at least 16 hours after discharge from the insect.

Macfie (5) reports feeding experiments on roaches species *Periplaneta americana*, which show that they may transmit many intestinal diseases mechanically. The bacilli of tuberculosis and the bacilli of leprosy as well as cysts of *Entamoeba histolytica*, *Entamoeba coli*, and *Giardia* were passed through roaches unharmed and virulent. The eggs of hookworm, *Ascaris* and *Trichuris* were also passed readily. In experiments with the bacilli of typhoid, paratyphoid, and dysentery, these organisms were not recovered from the feces of roaches.

Morrell (6) conducted experiments with roaches collected from the galley on shipboard. He found them to be naturally infected with *Bacillus lactis aerogenes* and *Bacillus cloacae* and certain molds. When the roaches were fed artificially he was able to recover tubercle bacilli and staphylococci from pus and spores from fungi. He reports that roaches can readily cause contamination of food by tubercle bacilli and other organisms and can cause the souring of milk, and he considers them a domestic pest.

Longfellow (7) incriminates roaches as mechanical carriers of common pathogenic bacteria which they deposit on foodstuffs and considers them as dangerous as the flies.

Rice (8) carefully observed routine ship fumigation by hydrocyanic acid–cyanogen chloride mixture and concluded that "with a ship properly closed and sealed, the cyanogen chloride and hydrocyanic gas developed by 120 gm. (4 ounces) of sodium cyanide to each 1,000 cubic feet, in conjunction with sodium chlorate and hydrochloric acid, will kill practically all Croton bugs in a 2-hour exposure. A 4-hour exposure would be more efficient, as the gas would then reach the roaches that were too well protected by cover to be reached by a shorter exposure. The same gas in the same time will kill the eggs of the Croton bug unless they are too well protected."

Neifert and Garrison (9) conducted careful experiments and found that the roach *Blatella germanica* was killed by a 30-minute exposure to 0.5 per cent concentration of cyanogen chloride gas and that the eggs were devitalized by a 60-minute exposure to 2 per cent concentration of the same gas. The roaches were also killed by a 15-minute exposure to a 0.2 per cent concentration of straight hydrocyanic acid gas.

The experiments here described were conducted at the San Francisco Quarantine Station, Angel Island, Calif., in a tightly sealed room containing approximately 500 cubic feet. The room was not heated, and so conditions were comparable as to temperature with those prevailing on shipboard at this port.

The tests extended from August, 1929, to February, 1930. The room opened off the laboratory, and apertures were arranged so that

roaches or chemicals could be placed in the room without opening the door. There was a glass in the door through which one could observe the effect of the gas upon the roaches. All of the roaches had been captured alive on shipboard. They were kept in wooden cages with screened sides, 6 by 4 by 4 inches, and were subjected to the gases in these containers. The cages contained varying numbers of roaches, from 2 to 200.

The following chemicals were used for fumigation: Hydrocyanic acid gas, generated from sodium cyanide, sulphuric acid, and water; hydrocyanic acid-cyanogen chloride gas mixture, generated from sodium cyanide, sodium chlorate, hydrochloric acid, and water; liquid hydrocyanic acid with 10 per cent chloropicrin; liquid hydrocyanic acid with 20 per cent cyanogen chloride, liquid hydrocyanic acid with 5 per cent chloropicrin, and Zyklon–B with 5 per cent chloropicrin.

After being subjected to fumigation, all roaches were kept in petri dishes at room temperature for two months to see whether any eggs would hatch.

Table 1 shows the result of 332 exposures of 304 lots of *Blattella germanica* to various fumigants. The table shows the amount of chemical used, the time of exposure, the number of roaches in the cage, the number of roaches killed, and the number alive after the exposure. The amount of chemical is recorded in avoirdupois units.

TABLE 1.—*Results of exposure of Blatella germanica to various fumigants*

No.	Chemical	Amount	Time	Number of roaches	Number killed	Number alive	Remarks
			Hours				
1	Zyklon-B	15 gm. to 500 cubic feet	¾	21	19	2	6 females; eggs hatched, several on fourth day.
	do	do	32½	2	2	0	Eggs hatched on second day.
2	do	do	½	5	4	1	No females.
3	do	do	32½	50	48	2	3 females.
	do	do	15½	2	1	1	
4	do	do	½	20	17	3	2 females.
	do	do	15½	3	1	2	
	do	do	8½	2	1	1	Survived 3 exposures.
5	do	do	1	12	7	5	3 females; 1 egg hatched.
	do	do	8½	5	0	5	
	do	do	8	5	0	5	Survived 3 exposures.
6	do	do	16	10	9	1	3 females.
	do	do	8½	1	0	1	Young ones hatched on third day, 50 in number.
7	do	30 gm. to 500 cubic feet	½	5	5	0	No females.
8	do	do	1	10	10	0	Do.
9	do	do	2	10	10	0	Do.
10	do	do	4	10	10	0	Do.
11	do	do	18	100	100	0	3 females.
12	do	22 gm. to 500 cubic feet	½	9	5	4	No females.
	do	do	10	4	1	3	
13	do	do	1	25	19	6	2 females.
	do	do	24	6	4	2	
	do	do	1	2	1	1	Survived 3 exposures.
14	do	do	2	12	11	1	No females.
15	do	do	28	5	4	1	Do.
	do	do	2	1	0	1	

TABLE 1.—*Results of exposure of Blatella germanica to various fumigants*—Con.

No.	Chemical	Amount	Time	Number of roaches	Number killed	Number alive	Remarks
			Hours				
16	Zyklon-B	22 gm. to 500 cubic feet	25	8	4	4	No females.
	do	do	1	4	2	2	
	do	do	8	2	0	0	
17	Liquid HCN, 10 per cent chloropicrin.	15 gm. to 500 cubic feet	1	3	3	0	1 female.
18	do	do	1	200	170	30	Several females.
	do	do	2	30	10	20	
	do	do	1	20	17	3	
19	do	do	1	10	10	0	1 female; young ones hatched on third day.
20	do	do	1½	20	20	0	Several females.
21	do	do	1½	40	37	3	6 females: young ones hatched on third day.
	do	do	½	3	2	1	16 young ones hatched on twenty-eighth day.
	do	do	2	1	0	1	
22	do	do	1½	15	15	0	3 females; young ones hatched on third day.
23	do	do	1½	30	30	0	5 females; young ones hatched on third day.
24	do	do	½	15	15	0	2 females.
25	do	do	½	5	5	0	No females.
26	do	do	½	7	7	0	3 females.
27	do	do	½	7	7	0	2 females.
28	do	do	½	25	24	1	1 female.
29	do	do	⅔	5	3	2	No females.
30	do	do	⅔	6	6	0	2 females; 10 young ones hatched on seventeenth day.
31	do	do	⅔	6	6	0	2 females.
32	do	do	⅔	20	20	0	3 females.
33	do	do	⅔	4	4	0	1 female.
34	do	do	½	8	8	0	No female.
35	do	do	½	30	30	0	10 females.
36	do	do	½	6	6	0	3 females; young ones hatched on sixteenth day.
37	do	7.5 gm. to 500 cubic feet	½	8	2	6	2 females.
	do	do	1	6	0	6	
38	do	do	½	10	4	6	1 female.
	do	do	1	6	0	6	
	do	do	19	6	0	6	
37-A	do	13 gm. to 500 cubic feet	½	6	3	3	2 females.
	do	do	1	3	2	1	
38-A	do	do	½	6	3	3	1 female.
	do	do	1	3	0	3	
	do	do	5	3	0	3	
	do	do	15	3	1	2	Young ones hatched on fifteenth day.
39	do	7.5 gm. to 500 cubic feet.	½	40	20	20	Several females.
39-A	do	13 gm. to 500 cubic feet.	½	10	10	0	Do.
40	do	22.5 gm. to 500 cubic feet.	½	8	4	4	2 females.
	do	do	1	4	0	4	
41	do	do	½	12	5	7	1 female.
	do	do	1	7	0	7	
42	do	do	½	3	1	2	No females.
43	do	do	½	6	4	2	Do.
	do	do	1	2	0	2	
44	do	15 gm. to 500 cubic feet.	½	8	8	0	2 females.
45	do	do	½	13	13	0	4 females.
46	do	do	½	12	12	0	Do.
47	do	do	½	6	6	0	No females.
48	Liquid HCN, 20 per cent CNCl.	do	½	8	5	3	2 females.
	do	do	½	3	0	3	
	do	do	2	3	2	1	
49	do	do	½	3	1	2	2 females.
	do	do	½	2	0	2	
50	do	do	½	6	6	0	No females.
51	do	do	½	5	3	2	2 females.

TABLE 1.—*Results of exposure of Blatella germanica to various fumigants*—Con.

No.	Chemical	Amount	Time	Number of roaches	Number killed	Number alive	Remarks
			Hours				
52	Liquid HCN, 20 per cent CNCl.	15 gm. to 500 cubic feet.	½	4	3	1	No females.
53	do	do	1	3	1	2	2 females.
	do	do	22	2	0	2	
54	do	do	1	4	1	3	1 female.
55	do	do	1	4	3	1	2 females.
56	do	22.5 gm. to 500 cubic feet.	1	12	7	5	1 female.
58	do	do	1	5	3	2	Do.
59	Liquid HCN, 10 per cent chloropicrin.	do	2	5	4	1	No females.
60	do	do	2	12	11	1	3 females.
61	do	do	2	10	8	2	1 female.
62	do	do	2	20	19	1	Do.
63	do	do	2	7	6	1	No females.
64	do	30 gm. to 500 cubic feet.	1	30	29	1	8 females.
65	Zyklon-B, 5 per cent chloropicrin.	do	1	4	4	0	1 female.
66	do	do	1	2	2	0	Do.
67	do	do	1	10	10	0	Do.
68	do	do	1	1	1	0	Do.
69	do	do	1	30	30	0	7 females.
70	do	do	1	7	7	0	1 female.
71	do	do	1	5	5	0	Do.
72	do	do	1	8	8	0	No females.
73	do	do	1	5	5	0	1 female.
74	Liquid HCN, 10 per cent chloropicrin.	do	1	2	2	0	No females.
75	do	do	1	7	7	0	Do.
76	do	do	1	5	0	5	1 female.
77	do	do	1	4	4	0	Do.
78	do	do	2	18	18	0	6 females.
79	do	do	2	7	7	0	1 female.
80	do	do	2	6	4	2	No females.
81	do	22.5 gm. to 500 cubic feet.	4	2	2	0	Do.
82	do	do	4	6	6	0	Do.
83	Zyklon-B, 5 per cent chloropicrin.	30 gm. to 500 cubic feet.	1	2	2	0	Do.
84	do	do	1	3	3	0	Do.
85	do	do	1	5	5	0	Do.
86	HCN generated	Sod. cy., 60 gm.; sulphuric acid, 90 gm.; water, 120 gm.	1	5	3	2	1 female.
87	do	do	1	3	3	0	No females.
88	do	do	1	4	4	0	Do.
89	do	do	1	10	8	2	Do.
90	do	do	1	9	9	0	3 females.
91	do	Sod. cy., 45 gm.; sulphuric acid, 67.5 gm.; water, 90 gm.	1	6	6	0	2 females.
92	do	do	1	6	6	0	No females.
93	do	do	1	2	2	0	Do.
94	do	do	1	3	2	1	1 female.
95	do	do	1	4	3	1	No females.
96	do	do	2	4	2	2	3 females.
97	do	do	2	3	1	2	1 female.
98	do	do	2	8	6	2	No females.
99	do	do	2	11	11	0	4 females.
100	do	Sod. cy., 60 gm.; sulphuric acid, 90 gm.; water, 120 gm.	2	1	1	0	No females.
101	do	do	2	21	21	0	4 females.
102	do	do	2	35	35	0	7 females.
103	do	do	2	20	20	0	2 females.
104	do	do	2	20	20	0	4 females.
105	do	do	2	22	22	0	No females.
106	do	do	2	14	14	0	1 female.
107	do	do	2	18	18	0	2 females.
108	do	do	2	30	30	0	6 females.
109	do	do	2	40	40	0	7 females.
110	do	do	2	11	11	0	8 females.
111	do	do	2	7	7	0	2 females.
112	do	do	2	45	45	0	8 females.
113	do	do	2	10	10	0	2 females.
114	Liquid HCN, 20 per cent CNCl.	30 gm. to 500 cubic feet.	2	5	4	1	1 female.
115	do	do	2	8	8	0	No females.
116	do	do	2	4	4	0	Do.

TABLE 1.—*Results of exposure of Blatella germanica to various fumigants*—Con.

No.	Chemical	Amount	Time	Number of roaches	Number killed	Number alive	Remarks
			Hours				
117	Liquid HCN, 20 per cent CNCl.	30 gm. to 500 cubic feet.	2	8	6	2	4 females.
118	do	do	2	26	23	3	7 females.
119	do	do	2	18	18	0	8 females.
120	do	do	2	20	15	5	6 females.
121	do	do	2	20	19	1	7 females.
122	do	do	2	12	12	0	8 females.
123	do	do	2	20	20	0	16 females
124	do	do	2	12	10	2	1 female.
125	do	do	2	16	15	1	4 females.
128	do	do	2	3	2	1	1 female.
129	do	do	2	22	21	1	8 females.
131	do	do	2	6	5	1	3 females.
132	do	do	2	2	2	0	No females.
133	do	do	2	6	6	0	Do.
134	do	do	2	24	22	2	3 females.
135	do	do	2	10	10	0	4 females.
136	do	45 gm. to 500 cubic feet.	2	6	6	0	1 female.
138	do	30 gm. to 500 cubic feet.	2	9	8	1	No females.
139	do	do	2	10	8	2	3 females.
140	do	do	2	5	4	1	1 female.
141	do	45 gm. to 500 cubic feet.	7	11	11	0	Do.
142	do	do	7	5	5	0	No females.
143	do	do	7	18	18	0	8 females.
144	do	do	7	16	16	0	4 females.
145	do	do	7	18	18	0	2 females.
146	do	do	7	30	30	0	11 females.
147	do	do	7	20	20	0	3 females.
148	do	do	2	22	21	1	Do.
149	do	do	2	27	25	2	No females.
150	do	do	2	15	13	2	Do.
151	do	do	2	12	12	0	1 female.
152	do	do	2	8	8	0	No females.
153	do	do	2	12	9	3	1 female.
154	do	do	2	12	10	2	No females.
155	do	do	2	13	13	0	Do.
156	do	do	2	30	30	0	2 females.
157	do	do	2	20	20	0	1 female.
158	do	do	2	44	44	0	12 females.
159	do	do	2	37	37	0	4 females.
160	do	do	2	9	9	0	2 females.
161	do	do	2	11	11	0	3 females.
162	do	do	2	15	15	0	4 females.
163	do	do	2	16	16	0	5 females.
164	do	do	2	10	10	0	3 females.
165	do	do	2	17	17	0	5 females.
166	do	do	2	10	4	6	2 females.
167	do	do	2	16	15	1	Do.
168	do	do	2	23	23	0	6 females.
169	do	do	2	14	14	0	2 females.
170	do	do	2	12	12	0	1 female.
171	do	do	2	15	11	4	3 females.
172	do	do	2	11	5	6	7 females.
173	HCN-CNCl generated.	Sod. cy., 60 gm.; sod. chlor., 45 gm.; HCl, 255 gm.; water, 255 gm.	2	18	17	1	4 females.
174	do	do	2	16	15	1	No females.
175	do	do	2	17	14	3	1 female.
176	do	do	2	18	16	2	3 females.
177	do	do	2	14	12	2	Do.
178	do	do	2	8	4	4	4 females.
179	do	do	2	35	35	0	9 females.
180	do	do	2	12	0	12	7 females.
181	do	do	2	12	4	8	3 females.
182	do	do	2	16	13	3	7 females.
183	do	do	2	6	0	6	3 females.
184	do	do	2	8	2	6	4 females.
185	do	do	2	12	8	4	Do.
186	do	do	2	12	6	6	8 females.
187	do	do	2	10	10	0	No females.
189	do	do	2	13	12	1	6 females.
190	do	do	2	38	36	2	3 females.
191	do	do	2	7	6	1	Do.
192	do	do	2	10	10	0	7 females.

TABLE 1.—*Results of exposure of Blatella germanica to various fumigants*—Con.

No.	Chemical	Amount	Time	Number of roaches	Number killed	Number alive	Remarks
			Hours				
193	HCN-CNCl generated.	Sod. cy., 90 gm.; sod. chlor., 60 gm.; HCl, 255 gm.; water, 255 gm.	2	9	4	5	4 females.
194	do	do	2	5	3	2	3 females.
195	do	do	2	9	8	1	No females.
196	do	do	2	9	8	1	Do.
197	do	do	2	8	7	1	Do.
198	do	do	2	11	8	3	2 females.
199	do	do	2	26	21	5	Do.
200	HCN generated	Sod. cy., 60 gm; sulphuric acid, 90 gm.; water, 120 gm.	2	9	8	1	4 females.
201	do	do	2	10	8	2	Do.
202	do	do	2	9	8	1	1 female.
203	do	do	2	8	8	0	No females.
204	do	do	2	7	7	0	Do.
205	do	do	2	7	6	1	1 female.
206	do	do	2	7	7	0	No females.
207	do	do	2	13	13	0	4 females.
208	do	do	2	10	10	0	2 females.
209	do	do	2	12	11	1	3 females.
210	do	do	2	7	7	0	2 females.
211	do	do	2	9	8	1	3 females.
212	do	do	2	14	11	3	6 females.
213	do	do	2	12	9	3	7 females.
214	do	do	2	8	8	0	1 female.
215	do	do	2	11	11	0	Do.
216	do	do	2	9	9	0	Do.
217	do	do	2	10	8	2	No females.
218	do	do	2	18	18	0	Do.
219	do	do	2	20	17	3	3 females.
220	do	do	2	20	20	0	4 females.
221	do	do	2	5	4	1	No females.
222	do	do	2	9	9	0	Do.
223	do	do	2	5	5	0	Do.
224	do	do	4	8	7	1	4 females.
225	do	do	4	11	9	2	Do.
226	do	do	4	14	11	3	3 females.
227	do	do	4	12	9	3	No females.
228	do	do	4	12	10	2	3 females.
229	do	do	4	9	9	0	2 females.
230	do	do	4	10	9	1	No females.
231	Liquid HCN, 20 per cent CNCl.	30 gm. to 500 cubic feet	4	12	11	1	1 female.
232	do	do	4	10	9	1	3 females.
233	do	do	4	10	8	2	1 female.
234	do	do	4	12	10	2	4 females.
235	do	do	4	13	11	2	2 females.
236	do	do	4	7	3	4	3 females.
237	do	do	4	13	13	0	Do.
238	do	do	4	17	17	0	Do.
239	do	do	4	9	9	0	1 female.
240	do	do	4	7	7	0	Do.
241	do	do	4	11	10	1	No females.
242	do	do	4	11	11	0	Do.
243	do	do	4	6	6	0	Do.
244	do	do	4	6	5	1	1 female.
245	do	do	4	10	10	0	2 females.
246	do	do	4	9	9	0	3 females.
247	do	do	4	10	8	2	Do.
248	do	do	4	17	17	0	7 females.
249	do	do	4	8	8	0	No females.
250	do	do	4	9	9	0	2 females.
251	do	do	4	11	11	0	4 females.
252	do	do	5	20	18	2	2 females.
253	do	do	5	13	13	0	Do
254	do	do	5	7	7	0	1 female.
255	do	do	5	12	11	1	4 females.
256	do	do	5	16	14	2	8 females.
257	do	do	5	16	11	5	6 females.
258	do	do	5	10	9	1	4 females.
259	Liquid HCN, 5 per cent chloropicrin.	do	4	18	18	0	No females.
260	do	do	4	10	10	0	Do.
261	do	do	4	7	7	0	Do.
262	do	do	4	6	6	0	1 female.
263	do	do	4	7	7	0	Do.
264	do	do	4	6	6	0	No females.
265	do	do	4	8	8	0	2 females.

TABLE 1.—*Results of exposure of Blatella germanica to various fumigants*—Con.

No.	Chemical	Amount	Time	Number of roaches	Number killed	Number alive	Remarks
			Hours				
266	Liquid HCN, 20 per cent CNCl.	30 gm. to 500 cubic feet.	4	6	5	1	1 female.
267	do	do	4	7	6	1	2 females.
268	do	do	4	6	5	1	Do.
269	do	do	4	9	9	0	No females.
270	Liquid HCN, 5 per cent chloropicrin.	do	4	26	26	0	2 females.
272	do	do	4	14	14	0	Do.
275	do	do	4	2	2	0	1 female.
276	do	do	4	7	7	0	2 females.
277	do	do	17	7	7	0	Do.
278	do	do	17	6	7	0	No females.
279	do	do	17	7	7	0	3 females.
281	do	do	17	10	10	0	4 females.
283	do	do	4	18	18	0	2 females.
284	do	do	4	15	15	0	3 females.
285	do	do	4	12	12	0	2 females.
286	do	do	4	16	16	0	9 females.
287	do	do	4	16	16	0	4 females.
288	do	do	4	12	12	0	1 female.
289	do	do	4	14	14	0	3 females.
290	do	do	2	16	16	0	Do.
291	do	do	2	12	11	1	2 females.
292	do	do	2	10	10	0	1 female.
293	do	do	2	12	12	0	5 females.
294	do	do	2	13	13	0	4 females.
295	do	do	2	18	18	0	3 females.
296	do	do	2	34	34	0	5 females.
297	do	do	2	6	6	0	No females.
298	do	do	2	7	7	0	2 females.
299	do	do	2	9	9	0	1 female.
300	do	do	2	14	14	0	3 females.
301	do	do	2	7	6	1	1 female.
302	do	do	2	5	5	0	No females.
303	do	do	2	22	22	0	10 females.
304	do	do	2	8	8	0	2 females.
305	do	do	2	6	6	0	1 female.
306	do	do	2	3	3	0	Do.
307	do	do	2	7	7	0	2 females.
308	do	do	2	6	6	0	Do.
309	do	do	2	12	12	0	6 females.

TABLE 2.—*Results of exposure of Periplaneta americana to certain fumigants*

Number	Chemical	Amount	Time	Number of roaches	Number killed	Number alive	Remarks
			Hours				
1	Zyklon-B	15 gm. to 500 cubic feet	¾	1	1	0	No females.
57	Liquid HCN, 20 per cent CNCl.	22.5 gm. to 500 cubic feet	1	5	2	3	Do.
	do	do	4	3	1	2	
158-A	Generated HCN-CNCl.	Sod. cy., 60 gm., sod. chlor. 45 gm., HCl, 255 gm., water, 255 gm.	2	7	6	1	1 female.
271	Liquid HCN with 5 per cent chloropicrin.	30 gm. to 500 cubic feet	4	9	9	0	No females.
274	do	do	4	4	4	0	Do.
280	do	do	17	3	3	0	Do.

TABLE 3.—*Results of exposure of Blatta orientalis to various fumigants*

Number	Chemical	Amount	Time	Number of roaches	Number killed	Number alive	Remarks
			Hours				
17	Liquid HCN, 10 per cent chloropicrin.	15 gm. to 500 cubic feet	1	6	1	5	No females.
	do	do	2	5	3	2	
	do	do	1	2	0	2	
	do	do	14½	2	0	2	
	do	do	½	2	1	1	
	do	do	2	1	0	1	
	do	do	21	1	0	1	
	Liquid HCN, 20 per cent CNCl.	do	2	1	0	1	Survived 8 exposures.
36-A	Liquid HCN, 10 per cent chloropicrin.	do	½	1	0	1	No females.
126	Liquid HCN, 20 per cent CNCl.	30 gm. to 500 cubic feet	2	3	0	3	Do.
127	do	do	2	3	0	3	Do.
130	do	do	2	3	0	3	Do.
137	do	45 gm. to 500 cubic feet	2	12	8	4	Do.
188	Generated HCN-CNCl.	Sod. cy. 60 gm., sod. chlor. 45 gm., HCl, 255 gm., water 255 gm.	2	4	3	1	Do.
273	Liquid HCN, 5 per cent chloropicrin.	30 gm. to 500 cubic feet	4	2	2	0	Do.
282	do	do	17	4	4	0	Do.

TABLE 4.—*Results of exposure of Blattella germanica to generated straight hydrocyanic acid*

Amount of fumigant	Time of exposure	Number of exposures	Positive results, all killed	Negative results, some survived
	Hours			
Sodium cyanide 60 gm., sulphuric acid 90 gm., water 120 gm., to 500 cubic feet.	1	5	3	2
	2	38	27	11
	4	7	1	6
Sodium cyanide 45 gm., sulphuric acid 67.5 gm., water 90 gm., to 500 cubic feet.	1	5	3	2
	2	4	1	3

TABLE 5.—*Results of exposure of Blattella germanica to generated hydrocyanic acid-cyanogen chloride mixture*

Amount of fumigant	Time of exposure	Number of exposures	Positive results, all killed	Negative results, some survived
	Hours			
Sodium cyanide 60 gm., sodium chlorate 45 gm., hydrochloric acid 255 gm., water 255 gm.	2	19	3	16
Sodium cyanide 90 gm., sodium chlorate 60 gm., hydrochloric acid 255 gm., water 255 gm.	2	7	0	7

Table 6.—*Results of exposure of Blattella germanica to liquid hydrocyanic acid with 10 per cent chloropicrin as tear gas*

Amount of fumigant	Time of exposure	Number of exposures	Positive results, all killed	Negative results, some survived or eggs hatched
	Hours			
7.5 gm. to 500 cubic feet	½	3	0	3
	1	2	0	2
	19	1	0	1
13 gm. to 500 cubic feet	½	3	1	2
	1	2	0	2
	5	1	0	1
	15	1	0	1
15 gm. to 500 cubic feet	½	13	10	3
	¾	5	3	2
	1	4	1	3
	1¼	4	1	3
	2	2	0	2
30 gm. to 500 cubic feet	1	5	3	2
	2	3	2	1
22.5 gm. to 500 cubic feet	½	4	0	4
	1	3	0	3
	2	5	0	5
	4	2	2	0

Table 7.—*Results of exposure of Blattella germanica to liquid hydrocyanic acid with 20 per cent cyanogen-chloride as tear gas*

Amount of fumigant	Time of exposure	Number of exposures	Positive results, all killed	Negative results, some survived
	Hours			
15 gm. to 500 cubic feet	½	7	1	6
	1	3	0	3
	2	1	0	1
	22	1	0	1
22.5 gm. to 500 cubic feet	1	2	0	2
30 gm. to 500 cubic feet	2	22	8	14
Do	4	25	16	9
Do	5	7	2	5
45 gm. to 500 cubic feet	2	26	17	9
	7	7	7	0

Table 8.—*Results of exposure of Blattella germanica to liquid hydrocyanic acid with 5 per cent chloropicrin as tear gas*

Amount of fumigant	Time of exposure	Number of exposures	Positive results, all killed	Negative results, some survived
	Hours			
30 gm. to 500 cubic feet	2	20	18	2
Do	4	18	18	0
Do	17	4	4	0

TABLE 9.—*Results of exposure of Blattella germanica to Zyklon-B with 5 per cent chloropicrin*

Amount of fumigant	Time of exposure	Number of exposures	Positive results, all killed	Negative results, some survived or eggs hatched
	Hours			
15 gm. to 500 cubic feet	½	2	0	2
	¾	1	0	1
	1	1	0	1
	8	1	0	1
	8½	3	0	3
	15½	2	0	2
	16	1	0	1
	32½	2	0	2
22.5 gm. to 500 cubic feet	½	1	0	1
	1	3	0	3
	2	2	0	2
	8	1	0	1
	10	1	0	1
	24	1	0	1
	28	2	0	2
30 gm. to 500 cubic feet	½	1	1	0
	1	13	13	0
	2	1	1	0
	4	1	1	0
	18	1	1	0

TABLE 10.—*Results of exposure of Periplaneta americana to certain fumigants*

Fumigant	Amount	Time of exposure	Number of exposures	Positive results, all killed	Negative results, some survived
		Hours			
Generated HCN-CNCl	Sodium cyanide 60 gm., sodium chlorate 45 gm., hydrochloric acid 255 gm., water 255 gm.	2	1	0	1
Liquid HCN, 20 per cent CNCl	22.5 gm. to 500 cubic feet	1	1	0	1
		4	1	0	1
Zyklon-B, 5 per cent chloropicrin.	15 gm. to 500 cubic feet	¾	1	1	0
Liquid HCN, 5 per cent chloropicrin.	30 gm. to 500 cubic feet	4	2	2	0
		17	1	1	0

TABLE 11.—*Results of exposure of Blatta orientalis to certain fumigants*

Fumigant	Amount	Time of exposure	Number of exposures	Positive results, all killed	Negative results, some survived
		Hours			
Generated HCN-CNCl	Sodium cyanide 60 gm., sodium chlorate 45 gm., hydrochloric acid 255 gm., water 255 gm.	2	1	0	1
Liquid HCN, 10 per cent chloropicrin.	15 gm. to 500 cubic feet	½	2	0	2
		1	2	0	2
		2	2	0	2
		14½	1	0	1
		21	1	0	1
Liquid HCN, 20 per cent CNCl	15 gm. to 500 cubic feet	2	1	0	1
	30 gm. to 500 cubic feet	2	3	0	3
	45 gm. to 500 cubic feet	2	1	0	1
Liquid HCN, 5 per cent chloropicrin.	30 gm. to 500 cubic feet	4	1	1	0
		17	1	1	0

COMMENT

It will be noted from the tables that negative results are recorded when only one or two roaches from a cage survived the exposure. It has happened many times that all roaches were apparently dead immediately after the exposure, but a few recovered enough to move about by the next day. Many roaches appeared to be partly paralyzed after fumigation, able only to kick their legs or move feebly, and never become active. Roaches were not fed before or after fumigation, and yet many survived for two weeks or more apparently without food. They were never observed to feed upon the dead roaches in the same container.

These experiments indicate that the amount of straight hydrocyanic acid gas generated from 120 gm. of sodium cyanide per 1,000 cubic feet can not be depended upon to kill all the roaches in a 2 or 4 hour exposure. Several live roaches were seen after exposure, but eggs were not observed to hatch.

After a 2-hour exposure to the gas generated from 180 gm. of sodium cyanide and 120 gm. of sodium chlorate per 1,000 cubic feet, live roaches were observed, but no eggs hatched.

Exposure to liquid hydrocyanic acid with 10 per cent chloropicrin in the proportion of 60 gm. or less per 1,000 cubic feet was not thoroughly effective in killing all roaches. Eggs hatched after exposure to 30 gm. per 1,000 cubic feet.

Exposure to liquid hydrocyanic acid with 20 per cent cyanogen-chloride in the proportion of 90 gm. or less per 1,000 cubic feet was not entirely effective in killing all roaches after a 2-hour exposure. Neither was an exposure in the proportion of 60 gm. per 1,000 cubic feet for 4 or 5 hours effective. Exposure to 90 gm. per 1,000 cubic feet for 7 hours was effective.

Liquid hydrocyanic acid with 5 per cent chloropicrin was effective in killing roaches in 18 out of 20 tests using 60 gm. per 1,000 cubic feet for 2 hours. This same amount was entirely effective in 18 tests when the exposure was for 4 hours.

Zyklon-B in the proportion of 60 gm. per 1,000 cubic feet for 1 hour exposure was effective in killing all roaches in 13 tests. Eggs were seen to hatch after exposure to this chemical in the amount of 30 gm. per 1,000 cubic feet.

It is thus seen that Zyklon-B and liquid hydrocyanic acid with 5 per cent chloropicrin probably have equal lethal effect and are effective in killing roaches in the proportion of 60 gm. per 1,000 cubic feet during a 2-hour exposure. This is the usual time of exposure for an empty vessel.

REFERENCES

(1) Fox, Carroll: Insects and Diseases of Man, 1925.
(2) Pryor, J. C.: Naval Hygiene. 1918.
(3) Toda, T.: Cholera and the ship cockroach.—Cockroaches and ants as carriers of vibrios of Asiatic cholera. Jour. Hyg., **21**, pp. 359–361, August, 1923.
(4) Barber, M. A.: Philippine Jour. of Science, IX, pp. 1–4.
(5) Macfie, J. W. S.: Observations on the rôle of cockroaches in disease. Annals of Trop. Med. No. 16, pp. 441–448, December, 1922.
(6) Morrell, C. C.: The bacteriology of the cockroach. British Med. Jour., 1911, Vol. II, p. 1531.
(7) Longfellow, R. C.: The common house roach as a carrier of disease. Am. Jour. Pub. Health, 1913, Vol. III, p. 58.
(8) Rice, C. E.: Destruction of cockroaches and devitalization of their eggs by cyanogen chloride mixture. Pub. Health Rep., **40**, pp. 1808–1811. Aug. 28, 1925.
(9) Neifert, I. E., and Garrison, G. T.: Experiments on the toxic action of certain gases on insects, seeds, and fungi. U. S. Department of Agriculture Bulletin No. 893, 1920.

PUBLIC HEALTH SERVICE PUBLICATIONS

A List of Publications Issued During the Period January-June, 1931

There is printed herewith a list of publications of the United States Public Health Service issued during the period January–June, 1931.

The most important articles that appear each week in the Public Health Reports are reprinted in pamphlet form, making possible a wider and more economical distribution of information that is of especial value and interest to public-health workers and the general public.

All of the publications listed below except those marked with an asterisk (*) are available for free distribution and, as long as the supply lasts, may be obtained by addressing the Surgeon General, United States Public Health Service, Washington, D. C. Those publications marked with an asterisk are not available for free distribution but may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., *at the prices noted.* (No remittances should be sent to the Public Health Service.)

Reprints from the Public Health Reports

1439. Studies on Leptospira Icterohemorrhagiae. By J. R. Ridlon. January 2, 1931. 5 pages.
1440. The National Leper Home (United States Marine Hospital), Carville, La. Review of the more important activities during the fiscal year ended June 30, 1930. By O. E. Denney. January 2, 1931. 8 pages.
1441. The Occurrence of Tularaemia in British Columbia. By R. R. Parker, Eric Hearle, and E. A. Bruce. January 9, 1931. 2 pages.
1442. Effect on Life Insurance Mortality Rates of Rejection of Applicants on the Basis of Medical Examination. By Rollo H. Britten. January 9, 1931. 17 pages.

1443. Age Incidence of Communicable Diseases in a Rural Population. By Edgar Sydenstricker and Selwyn D. Collins. January 16, 1931. 14 pages.
1444. The Incidence of Influenza Among Persons of Different Economic Status During the Epidemic of 1918. By Edgar Sydenstricker. January 23, 1931. 17 pages.
1445. The Stillbirth Problem in the United States. By E. Blanche Sterling. January 30, 1931. 8 pages.
1446. Public Health Service publications. A list of publications issued during the period July-December, 1930. January 30, 1931. 5 pages.
1447. The Work of the United States Public Health Service. February 6, 1931. 30 pages.
1448. Typhus Fever. A Virus of the Typhus Type Derived from Fleas Collected from Wild Rats. By R. E. Dyer, A. Rumreich, and L. F. Badger. February 13, 1931. 5 pages.
1449. The Influence of Arsenicals and Crystalline Glutathione on the Oxygen Consumption of Tissues. By Carl Voegtlin, Sanford M. Rosenthal, and J. M. Johnson. February 13, 1931. 16 pages.
1450. Studies on the Biochemistry of Sulphur. IX. The Estimation of Cysteine in the Presence of Glutathione. By M. X. Sullivan and Walter C. Hess. February 20, 1931. 4 pages.
1451. Experimental Studies of Natural Purification in Polluted Waters. IV. The Influence of the Plankton on the Biochemical Oxidation of Organic Matter. By C. T. Butterfield, W. C. Purdy, and E. J. Theriault. February 20, 1931. 34 pages.
1452. An Infection of the Rocky Mountain Spotted Fever Type. Identification in the Eastern part of the United States. By L. F. Badger, R. E. Dyer, and A. Rumreich. February 27, 1931. 8 pages.
1453. The Typhus-Rocky Mountain Spotted Fever Group. An Epidemiological and Clinical Study in the Eastern and Southeastern States. By A. Rumreich, R. E. Dyer, and L. F. Badger. February 27, 1931. 11 pages.
1454. Note on an Outbreak of Malaria in a Railroad Camp, Rawson Switch, Calif. By J. C. Geiger and J. P. Gray. March 6, 1931. 3 pages.
1455. Measurements for Jaeger's Test Types Used in Near Vision Tests. March 6, 1931. 3 pages.
1456. The Action of Sulphydryl, Iron, and Cyanide Compounds on the Oxygen Consumption of Living Cells. By Sanford M. Rosenthal and Carl Voegtlin. March 6, 1931. 19 pages.
1457. A Limited Rat Flea Survey of Savannah, Ga. By Carroll Fox. March 13, 1931. 2 pages.
1458. A Public-Health Survey of Oklahoma. By A. J. McLaughlin. March 13, 1931. 24 pages.
*1459. Conference on Medicinal and Scientific Requirements of Narcotic Drugs, Washington, D. C., August 12, 1930. A summary of the proceedings. October 3, 1930. 14 pages. 5 cents.
1460. The Fundamentals of Public Health Law. By James E. Bauman. March 20, 1931. 10 pages.
1461. Phosphorus, Total Calcium, and Diffusible Calcium Content of the Blood Sera of Lepers and Their Relation to Bone Changes. By Jerald G. Wooley, with the technical assistance of Hilary Ross. March 20, 1931. 18 pages.
1462. Antigenic Value of Scarlet Fever Streptococcus Toxin Modified by the Action of Formalin. By M. V. Veldee. March 27, 1931. 6 pages.

1463. Experimental Addiction of Animals to Opiates. By Lawrence Kolb and A. G. DuMez. March 27, 1931. 28 pages.
1464. Act Extending the Hours of Quarantine Inspection. March 27, 1931. 3 pages.
1465. Sickness Among Industrial Employees in the Second Half of 1930. April 3, 1931. 3 pages.
1466. Preliminary Report of Committee on Milk Production and Control. White House conference on child health and protection. April 3, 1931. 42 pages.
1467. The Psittacosis Outbreak in Maryland, December, 1929, and January, 1930. By V. L. Ellicott and Charles H. Halliday. April 10, 1931. 8 pages.
1468. Influence on Epilepsy of a Diet Low in the Pellagra-Preventive Factor. By N. P. Walker and G. A. Wheeler. April 10, 1931. 10 pages.
1469. Studies on Meningococci Isolated in the United States, 1928–1930. Serological Classification and Geographic Distribution. By Sara E. Branham, Clara E. Taft, and Sadie A. Carlin. April 17, 1931. 20 pages.
1470. Observations on the Assay of the Antineuritic Vitamin. Some of the Factors Involved in the Use of the Rat Method. By W. H. Sebrell and E. Elvove. April 17, 1931. 9 pages.
1471. Significance of Positive Wassermann and Kahn Reactions in Leprosy. By L. F. Badger. April 24, 1931. 14 pages.
1472. The County Health Unit of Yesterday and To-day. By Fred T. Foard. April 24, 1931. 7 pages.
1473. Fumigants. By C. L. Williams. May 1, 1931. 19 pages.
1474. Criteria for Maintaining Balance of Program in County Health Departments. By F. L. Roberts. May 8, 1931. 6 pages.
1475. Experimental Studies of Natural Purification in Polluted Waters. V. The Selection of Dilution Waters for Use in Oxygen Demand Tests. By Emery J. Theriault, Paul D. McNamee, and Chester T. Butterfield. May 8, 1931. 32 pages.
1476. Public Health Progress in Knoxville, Tenn. By Joseph W. Mountin. May 15 and 22, 1931. 61 pages.
1477. The Epidemic of So-called Ginger Paralysis in Southern California in 1930–31. By Maurice I. Smith and E. Elvove. May 22, 1931. 9 pages.
1478. Development of the Proposed Morbidity Reporting Area. By R. C. Williams. May 29, 1931. 6 pages.
1479. Studies on the Biochemistry of Sulphur. XI. The Substitution of Dithioethylamine (Cystine Amine) for Cystine in the Diet of the White Rat. By M. X. Sullivan, W. C. Hess, and W. H. Sebrell. May 29, 1931. 7 pages.
1480. Experimental Studies of Natural Purification in Polluted Waters. VI. Rate of Disappearance of Oxygen in Sludge. By Emery J. Theriault and Paul D. McNamee. May 29, 1931. 18 pages.
1481. Résumé of Report on Sanitation and Yellow Fever Control in Liberia. By H. F. Smith. June 5, 1931. 7 pages.
1482. Venereal Disease Among Coast Guard Enlisted Personnel During the Fiscal Year 1930. By W. W. King. June 5, 1931. 6 pages.
1483. Rocky Mountain Spotted Fever (Eastern type). Transmission by the American Dog Tick (Dermacentor variabilis). By R. E. Dyer, L. F. Badger, and A. Rumreich. June 12, 1931. 11 pages.
1484. Results of the Operation of the Standard Milk Ordinance in Missouri. By Franklin A. Clark and W. Scott Johnson. June 12, 1931. 12 pages.

1485. Report of Committee on Milk. Conference of State and Provincial Health Authorities of North America. By Earle G. Brown. June 19 1931. 5 pages.
1486. An epidemiological Study of Typhoid Fever in Six Ohio River Cities. By M. V. Veldee. June 19, 1931. 27 pages.
1487. Prevalence of Undulant Fever in the United States. By H. E. Hasseltine. June 26, 1931. 5 pages.
1488. Studies in Asphyxia. I. Neuropathology Resulting from Comparatively Rapid Carbon-Monoxide Asphyxia. By John Chornyak and R. R. Sayers. June 26, 1931. 8 pages.

Supplements to the Public Health Reports

88. The Notifiable Diseases. Prevalence During 1929 in States. 1931. 70 pages.
89. Studies on the Biochemistry of Sulphur. VIII. The Rate of Absorption of Cystine from the Gastrointestinal Tract of the White Rat. By M. X. Sullivan and W. C. Hess. 1931. 16 pages.
90. Detailed Instructions for the Performance of the Dissolved Oxygen and Biochemical Oxygen Demand Tests. By Emery J. Theriault. 1931. 34 pages.
91. State Laws Relating to the Control of Narcotic Drugs and the Treatment of Drug Addiction. 1931. 330 pages.
92. Studies on Oxidation-Reduction. XVI. The Oxazines; Nile Blue, Brilliant Cresyl Blue, Methyl Capri Blue, and Ethyl Capri Blue. By Barnett Cohen and Paul W. Preisler. 1931. 67 pages.
94. Studies on the Biochemistry of Sulphur. X. The Cystine Content of Meat and Fish. By M. X. Sullivan and W. C. Hess. 1931. 13 pages.
95. A Nomogram for the Calculation of Dissolved Oxygen. By C. T. Wright and Emery J. Theriault. 1931. 3 pages.

Public Health Bulletins

198. A Study of the Pollution and Natural Purification of the Illinois River. II. The Plankton and Related Organisms. By W. C. Purdy. 1930. 212 pages.
199. Studies in Physical Development and Posture. IV. Postural Relations as Noted in Twenty-two Hundred Boys and Men. By Louis Schwartz, Rollo H. Britten, and Lewis R. Thompson. 1931. 54 pages.

National Institute of Health Bulletin

158. Undulant Fever. With Special Reference to a Study of "Brucella" Infection in Iowa. By A. V. Hardy, C. F. Jordan, I. H. Borts, and Grace Campbell Hardy. 1930. 89 pages.

Reprints from Venereal Disease Information

27. Prevalence of Venereal Disease in the United States. By Lida J. Usilton. From Venereal Disease Information, Vol. XI, No. 12. 20 pages.
28. Comparative Effect of Stock Vaccine With Convalescent Serum and Stock Vaccine with Commercial Antigonococcal Serum in the Treatment of Gonorrheal Arthritis and Epididymitis. By Charles Ferguson, Robert A. Mee, and Lida J. Usilton. From Venereal Disease Information, Vol. XII, No. 1. 7 pages.

29. Cutaneous and Mucosal Relapse in Early Syphilis and its Differentiation from Reinfection. By John H. Stokes, Harold N. Cole, Joseph Earle Moore, Paul A. O'Leary, Thomas Parran, and Udo J. Wile. From Venereal Disease Information, Vol. XII, No. 2. 12 pages.
30. The Use of Bismuth in the Treatment of Syphilis. By H. N. Cole, in collaboration with J. Earle Moore, Paul A. O'Leary, Thomas Parran, John H. Stokes, and Udo J. Wile. From Venereal Disease Information, Vol. XII, No. 4. 13 pages.

SPECIAL COURSE IN CLINICAL TROPICAL MEDICINE

Hospital for Tropical Diseases, London

The Fellowship of Medicine and Post-Graduate Medical Association announces that a special course in clinical tropical medicine will be given at the Hospital for Tropical Diseases, London, during the period October 5–23, 1931. The course will consist of special lectures and demonstrations, with specimens, charts, lantern slides, and demonstrations of clinical cases where possible, and will include the following subjects: Enteric fever, undulant fever, phlebotomus fever, dengue fever, yellow fever, beriberi, pellagra, amebic abscess, heat-stroke, yaws, ulcerating granuloma, climatic bubo, filariasis, differential diagnosis of fevers, etc.

Further information regarding this course may be obtained by addressing the secretary, Fellowship of Medicine and Post-Graduate Medical Association, No. 1 Wimpole Street, W. 1., London.

DEATHS DURING WEEK ENDED JUNE 20, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended June 20, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce.)

	Week ended June 20, 1931	Corresponding week, 1930
Policies in force	75, 172, 566	75, 896, 166
Number of death claims	13, 023	13, 544
Death claims per 1,000 policies in force, annual rate	9. 0	9. 3

Deaths [1] from all causes in certain large cities of the United States during the week ended June 20, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended June 20, 1931				Corresponding week, 1930		Death rate [2] for the first 25 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,210	10.5	602	[4] 45	11.0	653	13.6	12.9
Akron	33	6.7	2	20	7.5	3	8.2	8.4
Albany [5]	28	11.3	2	40	11.0	2	13.1	15.9
Atlanta	74	13.9	7	72	15.7	11	15.0	16.7
White	34		1	16		3		
Colored	40	(6)	6	172	(6)	8	(6)	(6)
Baltimore [5]	169	10.8	15	51	10.6	13	15.8	14.9
White	136		10	43		10		
Colored	33	(6)	5	75	(6)	3	(6)	(6)
Birmingham	63	12.2	3	30	12.6	3	14.7	14.2
White	33		2	34		3		
Colored	30	(6)	1	24	(6)	0	(6)	(6)
Boston	163	10.8	17	49	13.3	21	15.5	15.7
Bridgeport	28	9.9	1	17	8.2	4	12.2	12.4
Buffalo	120	10.8	13	53	10.3	11	14.3	14.0
Cambridge	27	12.3	0	0	12.8	2	13.5	13.4
Camden	26	11.4	3	52	14.9	4	15.9	14.8
Canton	25	12.2	0	0	8.4	0	11.2	11.0
Chicago [5]	657	9.9	55	40	9.3	40	11.4	11.3
Cincinnati	125	14.3	5	30	15.0	13	16.8	16.4
Cleveland	163	9.3	15	44	10.0	8	12.0	12.1
Columbus	75	13.2	7	63	14.0	2	14.8	17.5
Dallas	49	9.4	4		12.1	8	12.1	12.1
White	32		3			7		
Colored	17	(6)	1		(6)	1	(6)	(6)
Dayton	42	10.6	1	14	12.4	2	12.9	10.5
Denver	74	13.2	5	48	11.6	6	15.0	15.1
Des Moines	36	13.0	0	0	9.8	1	11.6	12.5
Detroit	270	8.5	25	40	8.6	33	9.2	10.3
Duluth	20	10.2	1	25	11.3	2	11.3	11.8
El Paso	37	18.4	7		16.7	8	17.4	18.4
Erie	26	11.5	1	19	9.4	0	11.4	11.4
Fall River [5] [7]	19	8.6	0	0	11.3	4	13.2	13.5
Flint	18	5.7	3	38	9.9	6	7.9	10.0
Forth Worth	25	7.8	1		10.5	7	11.8	11.7
White	18		1			5		
Colored	7	(6)	0		(6)	2	(6)	(6)
Grand Rapids	26	7.9	2	30	12.6	1	9.7	11.4
Houston	69	11.6	10		13.2	11	11.6	12.8
White	46		8			5		
Colored	23	(6)	2		(6)	6	(6)	(6)
Indianapolis	96	13.5	4	33	12.4	3	14.5	15.3
White	74		4	38		3		
Colored	22	(6)	0	0	(6)	0	(6)	(6)
Jersey City	61	10.0	6	53	8.2	5	12.7	12.5
Kansas City, Kans	27	11.5	1	21	9.8	2	14.2	11.7
White	20		0	0		2		
Colored	7	(6)	1	127	(6)	0	(6)	(6)
Kansas City, Mo	95	12.1	2	15	13.2	14	14.3	13.7
Knoxville	25	11.9	4	85	14.2	5	13.7	14.7
White	21		4	95		4		
Colored	4	(6)	0	0	(6)	1	(6)	(6)
Long Beach	31	10.6	2	48	7.6	3	10.3	10.1
Los Angeles	237	9.4	25	73	12.3	20	11.3	11.6
Louisville	90	15.2	8	69	13.0	5	15.6	14.2
White	60		4	39		3		
Colored	30	(6)	4	265	(6)	2	(6)	(6)
Lowell [7]	32	16.6	2	51	13.5	2	13.5	14.8
Lynn	15	7.6	0	0	13.7	2	11.1	11.9
Memphis	72	14.5	10	106	16.6	4	17.2	17.9
White	37		3	50		2		
Colored	35	(6)	7	203	(6)	2	(6)	(6)
Miami	21	9.7	0	0	9.9	0	13.1	12.1
White	13		0	0		0		
Colored	8	(6)	0	0	(6)	0	(6)	(6)

Footnotes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended June 20, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued

City	Week ended June 20, 1931				Corresponding week, 1930		Death rate [2] for the first 25 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	90	8.0	16	69	9.1	11	10.0	10.5
Minneapolis	87	9.6	8	52	10.8	4	11.8	11.2
Nashville	41	13.7	5	74	17.6	6	17.4	16.5
White	25	--------	4	80	--------	6	--------	--------
Colored	16	(6)	1	59	(6)	0	(6)	(6)
New Bedford [7]	23	10.7	0	0	13.4	1	13.3	12.3
New Haven	29	9.3	1	19	15.7	4	12.7	14.5
New Orleans	126	14.1	11	60	17.0	17	18.0	18.7
White	63	--------	4	33	--------	12	--------	--------
Colored	63	(6)	7	114	(6)	5	(6)	(6)
New York	1,277	9.4	100	42	9.9	131	12.4	11.9
Bronx Borough	172	6.7	14	32	7.3	8	9.0	8.5
Brooklyn Borough	435	8.6	44	47	8.9	49	11.4	10.9
Manhattan Borough	501	14.4	33	56	14.7	60	19.0	17.8
Queens Borough	129	5.8	6	16	6.5	10	8.0	7.7
Richmond Borough	40	12.8	3	54	13.7	4	14.3	15.0
Newark, N. J.	89	10.4	9	47	9.2	7	12.8	13.4
Oakland	59	10.5	1	13	11.5	2	11.2	11.7
Oklahoma City	42	11.1	3	41	10.8	6	12.0	10.5
Omaha	47	11.3	6	67	13.1	3	14.7	13.8
Paterson	29	10.9	2	34	7.1	0	14.7	13.4
Philadelphia	453	12.0	42	61	11.1	29	14.8	13.5
Peoria	24	11.5	2	53	9.9	2	13.0	13.1
Pittsburgh	165	12.7	13	45	11.4	14	16.4	15.1
Portland, Oreg.	72	12.2	6	73	13.4	2	12.4	13.1
Providence	50	10.2	5	46	11.5	4	14.2	14.6
Richmond	43	12.2	2	29	15.4	5	16.9	15.9
White	29	--------	2	44	--------	2	--------	--------
Colored	14	(6)	0	0	(6)	3	(6)	(6)
Rochester	63	9.9	3	27	10.6	7	13.0	12.5
St. Louis	174	11.0	8	27	13.9	13	16.4	14.6
St. Paul	51	9.6	2	21	10.1	4	11.4	10.9
Salt Lake City [5]	30	10.9	4	60	11.9	2	13.0	13.7
San Antonio	74	16.1	24	--------	18.3	18	16.2	18.7
San Diego	37	12.3	3	61	12.6	0	14.8	14.8
San Francisco	146	11.7	0	0	10.8	11	13.8	13.5
Schenectady	11	6.0	1	29	9.8	0	10.9	12.2
Seattle	71	10.0	2	19	11.9	4	12.3	11.5
Somerville	17	8.4	2	74	6.0	1	10.4	11.1
South Bend	15	7.2	2	50	5.0	2	8.9	9.5
Spokane	29	13.0	5	130	14.4	2	12.9	13.3
Springfield, Mass.	27	9.2	4	61	11.1	3	13.3	13.5
Syracuse	46	11.3	5	59	11.4	0	12.5	13.0
Tacoma	16	7.7	0	0	9.3	0	13.3	13.0
Toledo	55	9.7	11	101	11.3	12	12.9	13.6
Trenton	25	10.5	2	35	14.4	3	18.3	17.7
Utica	18	9.2	0	0	10.8	1	15.4	16.4
Washington, D. C.	132	14.0	10	55	14.4	8	17.0	16.0
White	85	--------	7	57	--------	7	--------	--------
Colored	47	(6)	3	52	(6)	1	(6)	(6)
Waterbury	19	9.8	2	60	10.4	6	10.5	10.4
Wilmington, Del. [7]	18	8.8	3	65	13.2	1	15.5	15.5
Worcester	34	9.0	3	41	7.5	2	13.8	14.2
Yonkers	28	10.5	0	0	10.0	2	9.5	8.7
Youngstown	39	11.8	5	70	7.0	3	11.0	10.8

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Forth Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended June 27, 1931, and June 28, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 27, 1931, and June 28, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930
New England States:								
Maine	2	1	1	2	45	39	1	0
New Hampshire	--------	1	--------	--------	17	18	0	0
Vermont	--------	1	--------	--------	55	21	0	0
Massachusetts	44	48	1	--------	452	717	1	6
Rhode Island	2	7	--------	--------	102	25	0	0
Connecticut [1]	4	4	1	--------	205	24	1	0
Middle Atlantic States:								
New York	94	106	[2] 5	[2] 5	1,920	1,306	12	6
New Jersey	24	74	3	2	629	838	2	10
Pennsylvania	71	76	--------	--------	1,410	907	16	10
East North Central States:								
Ohio	31	32	12	10	933	378	6	7
Indiana	16	11	3	--------	102	123	6	4
Illinois	115	122	5	25	1,157	285	5	5
Michigan	27	58	--------	4	205	530	1	12
Wisconsin	6	5	9	6	442	429	1	2
West North Central States:								
Minnesota	9	11	--------	1	108	74	0	0
Iowa	2	3	--------	--------	23	51	0	2
Missouri	19	27	--------	--------	92	61	2	3
North Dakota	11	1	--------	--------	45	9	2	0
South Dakota	5	2	--------	--------	5	46	0	0
Nebraska	8	6	--------	--------	3	30	0	0
Kansas	4	7	--------	--------	59	187	1	2
South Atlantic States:								
Delaware	4	--------	--------	--------	60	3	0	0
Maryland [3]	13	10	1	2	274	25	2	0
District of Columbia	9	6	1	--------	32	48	0	0
Virginia [1]	--------	--------	--------	--------	--------	--------	--------	--------
West Virginia	5	3	3	3	204	40	0	1
North Carolina	8	7	1	34	343	72	1	2
South Carolina	5	5	142	126	60	--------	0	0
Georgia [1]	5	4	5	9	44	84	0	4
Florida	7	8	--------	--------	28	36	1	0
East South Central States:								
Kentucky	--------	3	--------	--------	24	22	2	0
Tennessee	2	3	3	20	21	47	3	1
Alabama [1]	6	9	--------	7	28	56	2	2
Mississippi	4	2	--------	--------	--------	--------	1	0
West South Central States:								
Arkansas	2	1	1	--------	15	11	1	3
Louisiana	19	9	4	10	2	8	0	2
Oklahoma [4]	5	20	5	3	14	47	0	0
Texas	9	21	12	6	69	54	0	2

[1] Typhus fever: 1931, 6 cases; 1 case in Connecticut; 1 case in Virginia; 1 case in Georgia; and 3 cases in Alabama.
[2] New York City only.
[3] Week ended Friday.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 27, 1931, and June 28, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930
Mountain States:								
Montana	2				21	3	0	0
Idaho		2			6	2	1	1
Wyoming		1			24	38	0	0
Colorado	5	1			68	171	0	1
New Mexico	6	3			30	15	0	2
Arizona	4	4			5	48	1	1
Utah [3]		2	3	4	10	68		1
Pacific States:								
Washington	7	6			36	250	0	0
Oregon	2		5	1	30	96	0	0
California	54	52	12	26	393	924	3	3

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930
New England States:								
Maine	0	0	6	13	0	0	2	1
New Hampshire	0	1	1	9	0	0	0	0
Vermont	0	0	7	2	12	0	0	0
Massachusetts	5	1	178	112	0	0	5	5
Rhode Island	0	0	25	6	0	0	0	1
Connecticut [1]	2	1	26	20	0	0	1	1
Middle Atlantic States:								
New York	7	4	378	136	15	9	13	14
New Jersey	1	0	149	63	0	0	6	6
Pennsylvania	0	1	426	202	1	0	14	23
East North Central States:								
Ohio	2	3	221	152	32	58	9	7
Indiana	1	0	45	47	62	114	8	2
Illinois	2	3	266	209	51	63	12	13
Michigan	1	1	274	151	13	53	3	4
Wisconsin	0	2	38	65	4	14	3	1
West North Central States:								
Minnesota	1	0	29	36	5	4	2	4
Iowa	0	0	15	17	14	73	1	3
Missouri	0	0	28	48	9	26	6	1
North Dakota	1	2	13	17	19	20	1	1
South Dakota	0	0	8	6	4	19	1	1
Nebraska	0	0	13	8	12	21	0	3
Kansas	0	0	11	26	59	57	6	3
South Atlantic States:								
Delaware	0	0	1	7	0	0	0	0
Maryland [3]	0	0	35	34	0	0	6	7
District of Columbia	0	0	8	7	0	0	0	0
Virginia [1]								
West Virginia	2	0	15		4	15	6	10
North Carolina	2	6	22	13	0	13	31	46
South Carolina	1	1	3	4	4	1	47	60
Georgia [1]	1	0	15	8	0	0	26	40
Florida	1	0	1	1	0	1	6	3
East South Central States:								
Kentucky	1	0	35	23	4	2	1	10
Tennessee	0	2	11	15	2	3	13	35
Alabama [1]	1	2	9	2	6	0	20	18
Mississippi	0	0	6	4	20	2	23	37
West South Central States:								
Arkansas	0	0	1	4	14	3	8	14
Louisiana	2	8	7	16	2	3	34	21
Oklahoma [4]	1	1	9	18	45	73	12	14
Texas	0	3	7	14	7	27	5	38

[1] Typhus fever: 1931, 6 cases; 1 case in Connecticut; 1 case in Virginia; 1 case in Georgia; and 3 cases in Alabama.
[3] Week ended Friday.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 27, 1931, and June 28, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930	Week ended June 27, 1931	Week ended June 28, 1930
Mountain States:								
Montana	1	0	5	5	3	3	3	1
Idaho	0	0	2	1	6	3	3	2
Wyoming	0	0	2	2	1	2	0	0
Colorado	0	1	18	10	5	2	4	2
New Mexico	0	0	0	7	0	1	4	0
Arizona	0	0	0	5	1	4	4	15
Utah [3]	0	0	7	8	0	0	1	1
Pacific States:								
Washington	0	0	16	13	8	31	2	2
Oregon	0	0	9	10	9	21	5	3
California	4	77	73	66	17	41	18	21

[3] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week

State	Cerebrospinal meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May, 1931										
Idaho	6	0			22		0	52	10	5
Louisiana	14	74	101	20	22	160	3	84	74	48
Montana	6	7	31		70		1	80	4	5
Oregon		31	90		424			74	90	8
South Dakota	1	41	24		186		4	52	59	3
Virginia	7	67	749	31	3,605	92	2	159	13	39
Washington	2	36	149		1,028		2	144	104	28

May, 1931

	Cases
Chicken pox:	
Idaho	39
Louisiana	108
Montana	167
Oregon	222
South Dakota	72
Virginia	642
Washington	578
Dengue:	
Louisiana	1
Diarrhea and dysentery:	
Virginia	172
Dysentery:	
Louisiana	1
German measles:	
Montana	31
Washington	52
Hookworm disease:	
Louisiana	14
Impetigo contagiosa:	
Montana	1
Oregon	18
Washington	5
Lethargic encephalitis:	
Louisiana	3
Washington	2

	Cases
Mumps:	
Idaho	16
Louisiana	8
Montana	80
Oregon	255
South Dakota	10
Washington	264
Paratyphoid fever:	
Idaho	1
Louisiana	1
Puerperal septicemia:	
Washington	4
Rabies in animals:	
Louisiana	7
Oregon	1
Rocky Mountain spotted or tick fever:	
Idaho	7
Montana	9
Oregon	24
Scabies:	
Montana	4
Oregon	3
Septic sore throat:	
Louisiana	7
Montana	1
Oregon	6

	Cases
Tetanus:	
Louisiana	6
Trachoma:	
Montana	3
South Dakota	6
Tularaemia:	
Idaho	1
Louisiana	3
Typhus fever:	
Virginia	2
Undulant fever:	
Idaho	6
Louisiana	5
Oregon	1

	Cases
Undulant fever:	
Virginia	1
Washington	1
Vincent's angina:	
Montana	4
Oregon	11
Whooping cough:	
Idaho	109
Louisiana	19
Montana	97
Oregon	75
South Dakota	43
Virginia	461
Washington	541

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,285,000. The estimated population of the 89 cities reporting deaths is more than 31,740,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended June 20, 1931, and June 21, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	768	851	
96 cities	420	417	660
Measles:			
45 States	11, 592	10, 437	
96 cities	4, 631	4, 002	
Meningococcus meningitis:			
46 States	71	111	
96 cities	32	55	
Poliomyelitis:			
46 States	37	105	
Scarlet fever:			
46 States	2, 953	2, 011	
96 cities	1, 414	891	854
Smallpox:			
46 States	604	995	
96 cities	48	62	39
Typhoid fever:			
46 States	319	412	
96 cities	58	48	50
Deaths reported			
Influenza and pneumonia:			
89 cities	463	454	
Smallpox:			
89 cities	0	0	

City reports for week ended June 20, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	5	0	0	----------	1	0	3	0
New Hampshire:								
Concord	0	0	0	----------	0	3	0	0
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Massachusetts:								
Boston	69	31	9	----------	0	57	11	11
Fall River	1	2	1	----------	0	19	7	1
Springfield	5	2	0	----------	0	47	26	1
Worcester	13	2	2	----------	0	3	19	1
Rhode Island:								
Pawtucket	0	0	0	----------	0	0	0	0
Providence	0	4	5	----------	2	89	0	7
Connecticut:								
Bridgeport	2	4	0	----------	0	6	4	1
Hartford	2	3	0	----------	0	0	0	2
New Haven	40	0	0	----------	0	40	9	3
MIDDLE ATLANTIC								
New York:								
Buffalo	29	8	7	----------	0	85	17	5
New York	277	218	116	3	9	872	84	103
Rochester	7	5	0	----------	0	180	11	3
Syracuse	20	1	0	----------	0	25	1	1
New Jersey:								
Camden	----------	6	----------	----------	----------	----------	----------	----------
Newark	57	11	3	1	0	22	4	2
Trenton	0	2	1	----------	1	15	7	0
Pennsylvania:								
Philadelphia	74	48	9	4	4	200	29	30
Pittsburgh	42	15	7	1	4	73	67	10
Reading	27	1	0	----------	0	9	3	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	8	4	2	----------	0	46	8	9
Cleveland	115	22	6	4	2	353	192	12
Columbus	20	2	1	2	1	11	3	1
Toledo	54	3	3	----------	0	10	8	4
Indiana:								
Fort Wayne	4	1	5	----------	0	3	0	1
Indianapolis	9	2	2	----------	0	75	10	11
South Bend	0	0	0	----------	0	10	0	1
Terre Haute	1	0	0	----------	0	10	0	0
Illinois:								
Chicago	158	81	101	3	3	847	55	49
Springfield	----------	0	----------	----------	----------	----------	----------	----------
Michigan:								
Detroit	69	37	21	2	1	64	34	8
Flint	16	1	1	----------	0	1	5	1
Grand Rapids	0	1	0	----------	0	69	1	0

City reports for week ended June 20, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	3	0	0	----------	0	2	70	0
Madison	11	0	1	----------	----------	1	45	----------
Milwaukee	108	9	5	----------	0	405	188	4
Racine	15	0	1	----------	0	4	12	0
Superior	3	1	1	----------	0	0	1	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	13	0	0	----------	1	0	0	3
Minneapolis	36	10	8	----------	0	66	7	6
St. Paul	33	6	5	----------	0	32	1	4
Iowa:								
Davenport	4	1	0	----------	----------	0	0	----------
Des Moines	2	1	0	----------	----------	0	0	----------
Sioux City	9	0	0	----------	----------	5	9	----------
Waterloo	0	0	0	----------	----------	0	0	----------
Missouri:								
Kansas City	5	2	3	----------	0	57	1	8
St. Joseph	2	0	0	----------	0	4	0	1
St. Louis	16	25	9	----------	----------	3	17	5
North Dakota:								
Fargo	0	0	0	----------	0	1	1	2
Grand Forks	0	0	0	----------	----------	1	0	----------
South Dakota:								
Aberdeen	1	0	0	----------	----------	4	0	----------
Nebraska:								
Omaha	5	2	2	----------	0	2	10	4
Kansas:								
Topeka	4	0	0	----------	1	2	47	0
Wichita	11	1	0	----------	0	1	0	3
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	0	0	----------	0	5	2	1
Maryland:								
Baltimore	40	15	7	2	0	195	41	12
Cumberland	0	0	0	----------	0	1	0	0
Frederick	0	0	0	----------	0	2	0	0
District of Columbia:								
Washington	20	7	8	----------	0	58	0	8
Virginia:								
Lynchburg	6	1	0	----------	0	0	0	1
Norfolk	1	0	0	----------	0	11	2	1
Richmond	0	1	0	----------	0	21	0	1
Roanoke	1	0	0	----------	1	4	0	2
West Virginia:								
Charleston	0	0	0	----------	0	0	3	1
Wheeling	1	0	0	----------	0	2	0	0
North Carolina:								
Raleigh	1	0	0	----------	0	16	0	0
Wilmington	0	0	0	----------	0	2	0	1
Winston-Salem	0	0	2	----------	0	71	4	2
South Carolina:								
Charleston	0	0	0	20	0	0	0	4
Columbia	0	0	1	----------	0	0	1	2
Greenville	1	0	0	----------	0	0	0	0
Georgia:								
Atlanta	0	1	2	1	1	3	0	4
Brunswick	0	0	0	----------	0	0	0	0
Savannah	2	0	1	----------	0	6	7	4
Florida:								
Miami	0	1	0	1	0	27	0	1
Tampa	0	1	1	----------	0	2	[illegible]	2

City reports for week ended June 20, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0	----------	0	0	0	2
Tennessee:								
Memphis	2	1	0	----------	0	102	3	5
Nashville	2	0	0	----------	0	38	0	1
Alabama:								
Birmingham	3	0	0	1	0	4	3	5
Mobile	2	0	1	----------	0	1	0	0
Montgomery	0	0	0	----------	----------	0	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	3	1	0	----------	----------	0	0	----------
Little Rock	0	0	0	----------	0	1	0	3
Louisiana:								
New Orleans	1	6	18	1	1	0	0	6
Shreveport	0	0	0	----------	0	1	1	3
Oklahoma:								
Muskogee	1	0	0	----------	0	0	0	----------
Tulsa	4	0	0	----------	----------	1	0	----------
Texas:								
Dallas	2	3	1	1	2	3	1	2
Fort Worth	0	1	1	----------	1	1	0	0
Galveston	0	0	0	----------	0	1	0	2
Houston	0	2	5	----------	0	6	1	2
San Antonio	0	2	1	----------	1	14	0	1
MOUNTAIN								
Montana:								
Billings	7	0	0	----------	0	5	0	0
Great Falls	8	0	0	----------	0	3	0	1
Helena	0	0	0	----------	0	1	0	0
Missoula	2	0	0	----------	0	0	0	0
Idaho:								
Boise	0	0	0	----------	0	1	0	0
Colorado:								
Denver	15	7	3	----------	1	50	18	6
Pueblo	2	0	0	----------	0	8	0	0
New Mexico:								
Albuquerque	8	0	0	----------	0	3	0	1
Arizona:								
Phoenix	0	1	0	----------	0	2	0	0
Utah:								
Salt Lake City	11	3	0	----------	0	2	2	1
Nevada:								
Reno	0	0	0	----------	0	0	0	1
PACIFIC								
Washington:								
Seattle	26	2	0	----------	----------	6	5	----------
Spokane	13	2	0	----------	----------	3	0	----------
Tacoma	7	1	2	----------	0	0	3	0
Oregon:								
Portland	11	5	0	----------	1	14	6	6
Salem	5	0	2	1	0	0	7	0
California:								
Los Angeles	23	27	23	15	1	49	18	5
Sacramento	2	1	1	----------	0	26	1	4
San Francisco	5	11	10	2	1	70	1	5

City reports for week ended June 20, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	2	7	0	0	0	0	1	0	0	2	13
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	4
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	5
Massachusetts:											
Boston	52	50	0	0	0	7	2	1	1	29	163
Fall River	3	7	0	0	0	0	0	1	0	3	19
Springfield	4	8	0	0	0	0	0	0	0	3	24
Worcester	7	12	0	0	0	2	0	0	0	7	34
Rhode Island:											
Pawtucket	2	3	0	0	0	0	0	0	0	0	19
Providence	6	14	0	2	0	3	1	1	0	4	50
Connecticut:											
Bridgeport	5	4	0	0	0	2	0	0	0	2	28
Hartford	2	2	0	0	0	3	0	1	0	2	28
New Haven	3	0	0	0	0	0	0	0	0	8	29
MIDDLE ATLANTIC											
New York:											
Buffalo	19	25	0	0	0	2	0	0	0	14	118
New York	161	306	0	0	0	73	10	23	2	212	1,277
Rochester	7	42	0	0	0	0	1	0	0	8	61
Syracuse	6	15	0	0	0	2	------	0	0	32	46
New Jersey:											
Camden	4	------	0	------	------	------	0	------	------	------	------
Newark	17	21	0	0	0	7	0	0	0	126	90
Trenton	2	8	0	0	0	3	0	0	0	1	25
Pennsylvania:											
Philadelphia	65	126	0	0	0	42	2	3	1	40	453
Pittsburgh	23	71	0	0	0	7	0	1	0	50	165
Reading	3	0	0	0	0	0	0	0	0	0	17
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	10	36	2	0	0	6	1	0	0	6	125
Cleveland	28	40	0	0	0	8	1	1	1	32	163
Columbus	5	6	1	0	0	9	0	0	0	0	75
Toledo	11	5	0	0	0	10	1	0	0	27	56
Indiana:											
Fort Wayne	2	0	1	0	0	2	0	0	0	1	27
Indianapolis	7	17	6	7	0	7	0	0	0	33	------
South Bend	3	0	0	0	0	0	0	1	0	1	15
Terre Haute	1	1	0	0	0	1	0	0	0	0	16
Illinois:											
Chicago	89	213	1	0	0	47	2	3	0	82	657
Springfield	2	------	0	------	------	------	0	------	------	------	------
Michigan:											
Detroit	79	163	1	0	0	23	1	1	0	135	270
Flint	9	10	1	1	0	3	0	0	0	6	18
Grand Rapids	6	3	0	0	0	0	0	0	0	17	------
Wisconsin:											
Kenosha	1	0	0	0	0	0	0	0	0	0	5
Madison	2	0	0	0	------	------	0	0	------	2	------
Milwaukee	21	17	0	0	0	4	0	0	0	53	90
Racine	2	4	0	0	0	0	0	0	0	25	20
Superior	2	0	0	0	0	0	0	0	0	0	6
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	0	0	0	0	0	0	0	0	0	20
Minneapolis	22	14	0	0	0	1	0	0	0	1	87
St. Paul	15	2	0	0	0	4	0	0	0	20	55
Iowa:											
Davenport	0	0	1	3	------	------	0	0	------	0	------
Des Moines	4	8	2	11	------	------	0	0	------	0	36
Sioux City	0	0	0	0	------	------	0	0	------	11	------
Waterloo	1	2	0	0	------	------	0	0	------	0	------

City reports for week ended June 20, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—continued											
Missouri:											
Kansas City	7	3	0	0	0	7	0	0	0	15	95
St. Joseph	0	2	1	0	0	0	0	0	0	0	33
St. Louis	17	35	1	4	0	11	2	3	2	38	174
North Dakota:											
Fargo	1	1	0	0	0	0	0	0	0	7	6
Grand Forks	1	0	0	0			0	0		0	
South Dakota:											
Aberdeen	0	0	0	1			0	0		0	
Nebraska:											
Omaha	2	4	2	5	0	0	0	0	0	1	47
Kansas:											
Topeka	1	4	0	0	0	0	0	0	0	0	26
Wichita	3	2	0	6	0	1	0	0	0	5	33
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	0	0	0	0	1	0	0	0	2	18
Maryland:											
Baltimore	28	13	0	0	0	13	2	0	0	78	169
Cumberland	0	0	0	0	0	0	0	0	0	0	16
Frederick	0	0	0	0	0	0	0	0	0	0	6
District of Columbia:											
Washington	14	13	0	0	0	8	1	0	0	14	132
Virginia:											
Lynchburg	0	0	0	0	0	1	0	0	0	0	17
Norfolk	1	2	0	0	0	0	0	0	0	4	
Richmond	1	0	0	0	0	3	0	0	0	0	44
Roanoke	0	1	0	0	0	0	1	0	0	3	23
West Virginia:											
Charleston	1	0	0	0	0	1	0	0	0	1	18
Wheeling	1	0	0	0	0	0	0	0	0	2	11
North Carolina:											
Raleigh	0	0	0	0	0	1	0	0	1	22	10
Wilmington	0	0	0	0	0	0	0	0	0	14	13
Winston-Salem	0	0	0	0	0	1	1	0	0	30	17
South Carolina:											
Charleston	0	0	1	0	0	4	0	0	0	0	21
Columbia	0	0	0	0	0	0	2	1	0	1	12
Greenville	0	0	0	1	0	0	0	0	0	3	
Georgia:											
Atlanta	3	11	2	7	0	9	1	3	0	1	74
Brunswick	0	0	0	0	0	0	0	0	0	0	6
Savannah	1	1	0	0	0	0	1	2	1	6	30
Florida:											
Miami	1	1	0	0	0	1	0	0	0	5	21
Tampa	0	0	0	0	0	2	1	1	0	0	28
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	6	1	0	0	1	0	0	0	0	17
Tennessee:											
Memphis	2	4	1	2	0	6	2	0	0	0	72
Nashville	1	6	1	0	0	2	1	2	0	7	41
Alabama:											
Birmingham	0	0	2	0	0	7	1	0	0	16	63
Mobile	0	0	0	0	0	2	0	0	0	0	27
Montgomery	0	0	0	0			0	0		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			0	0		0	
Little Rock	0	0	0	0	0	4	0	0	0	0	11
Louisiana:											
New Orleans	4	5	0	4	0	16	3	2	1	0	126
Shreveport	1	0	0	0	0	0	1	0	0	2	29

City reports for week ended June 20, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL—continued											
Oklahoma:											
Muskogee	0	0	2	0			0	0		0	
Tulsa	1	2	1	15			1	0		3	
Texas:											
Dallas	2	2	1	2	0	2	1	0	0	13	49
Fort Worth	1	1	1	1	0	3	1	0	0	0	25
Galveston	0	1	0	0	0	2	0	0	0	0	13
Houston	1	1	1	0	0	3	1	0	0	0	69
San Antonio	0	0	0	0	0	7	0	2	0	0	74
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	1	11
Great Falls	1	1	0	0	0	1	0	0	0	8	9
Helena	0	0	0	0	0	0	0	0	0	0	5
Missoula	0	1	0	0	0	0	0	0	0	0	5
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	1	11
Colorado:											
Denver	7	6	0	0	0	7	0	0	0	41	81
Pueblo	0	0	0	0	0	1	0	0	0	5	11
New Mexico:											
Albuquerque	1	0	0	0	0	3	0	1	0	0	10
Arizona:											
Phoenix	0	0	0	0	0	2	1	0	0	0	
Utah:											
Salt Lake City	2	1	1	0	0	1	1	0	0	27	30
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	7
PACIFIC											
Washington:											
Seattle	6	4	1	0			1	1		44	
Spokane	4	0	4	8			1	0		6	
Tacoma	2	0	1	0	0	0	0	0	0	7	16
Oregon:											
Portland	4	1	8	1	0	3	1	0	0	1	
Salem	1	0	0	0	0	0	0	0	0	0	
California:											
Los Angeles	24	20	4	0	0	21	2	2	0	16	237
Sacramento	3	0	1	0	0	1	0	2	0	2	19
San Francisco	14	5	0	0	0	7	1	0	0	14	157

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	1	0	0	0	0	0	1	0
Worcester	0	0	0	0	1	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York [1]	6	4	4	1	1	0	1	4	0
Pennsylvania:									
Philadelphia	5	2	2	1	0	0	0	0	0
Pittsburgh	3	2	1	1	0	0	0	0	0

[1] Typhus fever, 5 cases; 2 cases at New York, N. Y.; 1 case at Baltimore, Md.; 1 case at Atlanta, Ga., and 1 case at Savannah, Ga.

City reports for week ended June 20, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Death
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Cleveland	3	2	1	0	0	0	0	0	0
Columbus	0	1	0	0	0	0	0	0	0
Toledo	0	1	0	0	0	0	0	0	0
Indiana:									
Indianapolis	2	1	0	0	0	0	0	0	0
Illinois:									
Chicago	6	7	1	1	1	1	1	0	0
Michigan:									
Detroit	1	0	0	1	0	0	0	0	0
Flint	1	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
St. Paul	0	0	0	0	0	0	0	1	0
Missouri:									
St. Louis	1	0	1	0	0	0	0	1	1
SOUTH ATLANTIC									
Maryland:									
Baltimore [1]	1	0	0	0	2	2	0	0	0
District of Columbia:									
Washington	1	0	1	1	0	0	0	0	0
Virginia:									
Norfolk	0	0	0	0	0	1	0	0	0
North Carolina:									
Wilmington	0	0	0	0	0	1	0	0	0
Winston-Salem	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	7	1	0	0	0
Georgia: [1]									
Savannah [1]	0	0	0	0	2	1	0	0	0
Florida:									
Miami	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	0	0	0	0	2	0	0	0
Alabama:									
Birmingham	0	0	0	0	1	0	1	2	0
Mobile	0	0	0	0	0	1	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Fort Smith	0	0	0	0	3	0	0	0	0
Little Rock	0	0	0	0	0	3	0	0	0
Louisiana:									
New Orleans	0	0	0	0	2	3	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas:									
Dallas	0	0	0	0	1	2	0	0	0
Galveston	0	0	0	0	0	1	0	0	0
San Antonio	0	1	0	0	0	0	0	0	0
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	0	1	0
New Mexico:									
Albuquerque	0	0	0	0	0	1	0	0	0
PACIFIC									
California:									
Los Angeles	1	0	0	0	0	0	1	1	1
San Francisco	0	1	0	1	0	0	0	0	0

[1] Typhus fever, 5 cases; 2 cases at New York, N. Y.; 1 case at Baltimore, Md.; 1 case at Atlanta, Ga., and 1 case at Savannah, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended June 20, 1931, compared with those for a like period ended June 21, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, May 17 to June 20, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

	Week ended—									
	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930
DIPHTHERIA CASE RATES										
98 cities	62	79	50	76	67	75	54	78	[2] 66	66
New England	48	68	50	56	46	94	41	39	41	39
Middle Atlantic	63	76	58	67	74	68	55	78	[3] 65	77
East North Central	67	115	81	110	75	112	64	128	[4] 89	92
West North Central	75	72	54	77	55	52	61	60	52	35
South Atlantic	38	54	41	60	39	54	49	44	43	36
East South Central	12	24	17	36	12	12	17	12	6	12
West South Central	81	52	54	49	68	38	27	80	85	80
Mountain	61	53	52	44	191	18	25	35	26	9
Pacific	72	59	37	67	49	65	53	36	71	47
MEASLES CASE RATES										
98 cities	1,372	1,159	1,114	911	1,096	934	876	815	[2] 725	642
New England	1,190	1,877	935	1,558	933	1,596	601	1,546	635	1,144
Middle Atlantic	1,478	1,091	1,187	940	1,101	1,021	838	1,033	[3] 669	776
East North Central	1,458	685	1,304	524	1,446	512	1,304	453	[4] 1,182	377
West North Central	1,098	794	641	525	817	420	448	370	331	302
South Atlantic	2,840	957	2,089	793	1,473	523	1,102	397	766	411
East South Central	1,234	568	1,047	335	1,140	371	820	161	844	239
West South Central	271	547	294	453	254	115	149	94	88	77
Mountain	618	7,119	461	5,674	870	5,665	705	3,410	609	2,687
Pacific	456	2,180	492	1,397	511	1,903	580	1,340	302	1,069
SCARLET FEVER CASE RATES										
98 cities	367	206	306	182	310	208	269	188	[2] 221	141
New England	536	314	351	307	414	232	291	218	272	126
Middle Atlantic	442	204	304	162	355	186	318	147	[3] 280	112
East North Central	412	227	438	264	422	293	386	301	[4] 312	226
West North Central	340	306	291	213	258	265	168	238	132	151
South Atlantic	241	164	239	126	197	170	122	158	77	106
East South Central	390	102	297	72	151	96	169	48	93	60
West South Central	85	49	51	14	41	73	88	35	30	98
Mountain	270	300	165	97	104	194	96	132	78	203
Pacific	88	97	110	71	86	93	80	97	57	73

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Camden, N. J., and Springfield, Ill., not included.
[3] Camden, N. J., not included.
[4] Springfield, Ill., not included.

Summary of weekly reports from cities, May 17 to June 20, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	May 23, 1931	May 24, 1930	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930
98 cities	16	20	15	15	14	20	10	14	[2] 8	10
New England	0	0	0	0	0	0	0	0	5	0
Middle Atlantic	4	0	1	1	0	1	1	0	[3] 6	0
East North Central	15	10	11	12	16	8	12	11	[4] 5	7
West North Central	67	110	88	57	42	115	31	54	24	61
South Atlantic	6	2	24	10	18	4	0	5	14	2
East South Central	41	30	6	30	17	60	23	50	12	18
West South Central	47	10	37	14	41	21	24	21	20	24
Mountain	0	70	26	62	26	62	17	35	0	35
Pacific	12	71	12	49	33	59	25	40	15	36

TYPHOID FEVER CASE RATES

98 cities	6	7	7	7	6	8	7	9	[2] 9	8
New England	2	19	2	12	2	5	0	10	10	0
Middle Atlantic	5	4	8	3	5	6	7	8	[3] 12	4
East North Central	5	5	2	2	1	4	4	4	[4] 4	2
West North Central	10	8	4	10	10	10	4	6	6	8
South Atlantic	12	12	22	14	20	22	14	16	14	24
East South Central	17	24	12	36	17	12	17	21	12	48
West South Central	7	10	7	21	10	35	24	17	14	24
Mountain	0	0	17	9	17	0	9	9	0	9
Pacific	8	6	2	8	4	2	12	16	10	6

INFLUENZA DEATH RATES

91 cities	7	6	7	4	6	5	4	6	[2] 6	4
New England	5	5	10	0	2	0	0	2	7	2
Middle Atlantic	5	7	3	4	3	4	4	3	[3] 8	3
East North Central	5	5	5	4	2	4	4	6	[4] 4	4
West North Central	3	0	9	3	6	12	6	15	6	0
South Atlantic	4	6	15	4	14	10	6	2	4	2
East South Central	13	13	13	32	35	18	13	13	0	13
West South Central	28	7	14	4	10	11	3	25	14	7
Mountain	26	9	17	18	0	9	0	0	9	0
Pacific	0	5	5	2	7	2	5	5	5	0

PNEUMONIA DEATH RATES

91 cities	95	101	101	78	80	83	75	83	[2] 70	72
New England	72	100	111	97	120	80	60	89	65	75
Middle Atlantic	121	130	109	89	102	100	88	96	[3] 73	78
East North Central	68	79	75	53	59	58	60	66	[4] 59	52
West North Central	97	84	133	63	138	132	71	78	106	111
South Atlantic	111	110	132	90	77	102	83	80	89	70
East South Central	120	78	183	97	75	71	145	97	82	117
West South Central	97	82	128	121	86	78	79	100	76	64
Mountain	70	123	79	79	87	115	70	88	78	132
Pacific	55	35	43	52	48	32	43	57	34	60

[2] Camden, N. J., and Springfield, Ill., not included.
[3] Camden, N. J., not included.
[4] Springfield, Ill., not included.

FOREIGN AND INSULAR

BRITISH CAMEROONS

Mamfe—Yellow fever.—Three suspected cases of yellow fever with two deaths were reported at Mamfe, British Cameroons, May 28, 1931.

CANADA

Provinces—Communicable diseases—Week ended June 13, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended June 13, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		4			
New Brunswick [1]					
Quebec					3
Ontario	3	1	1	4	15
Manitoba					3
Saskatchewan				16	
Alberta			1		
British Columbia	1		3		
Total	4	5	5	20	21

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended June 20, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended June 20, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	38	Mumps	19
Diphtheria	15	Scarlet fever	37
Erysipelas	1	Tuberculosis	19
German measles	42	Typhoid fever	6
Measles	290	Whooping cough	25

CUBA

Provinces—Communicable diseases—Four weeks ended June 6, 1931.—During the four weeks ended June 6, 1931, cases of certain communicable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer				1			1
Chicken pox		34	1	5	1	7	48
Diphtheria	2	18	1	7	2	1	31
Malaria		4			2	23	29
Measles		93		30			123
Paratyphoid fever		1	2	2			5
Scarlet fever		7	1				8
Typhoid fever	7	46	2	36	7	9	107

VIRGIN ISLANDS

Communicable diseases—May, 1931.—During the month of May, 1931, cases of certain diseases were reported in the Virgin Islands as follows:

St. Thomas and St. John:	Cases
Gonorrhea	4
Pellagra	1
Syphilis	5
Tuberculosis	2

St. Croix:	Cases
Chancroid	2
Chicken pox	1
Gonorrhea	1

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13	20	27
Ceylon: Colombo	C				1								1	1			
	D												1	1			
China: Canton	C					1						2					
	D											1					
India	C	10,637	15,334	11,544	8,968	3,161	3,067	2,668	2,566								
	D	5,689	8,123	6,131	4,550	1,571	1,550	1,360	1,286								
Bombay	C		21			2											
	D		9			1											
Calcutta	C	28	121	170	436	95	82	62	71	72	89	49	53	94	74		
	D	20	86	112	256	55	51	26	44	39	44	34	32	57	17		
Karikal	C	1		9	12	10	8	1		10		1	1				
	D			8	12	5	8	1		5		1	1				
Madras	C	201	69	72	20	3	1	4	18	18	23	11		3	6		
	D	67	47	29	10	5	1	3	5	6	8	2	1		4		
Negapatam	D		3	3													
Rangoon	C	1											2			2	
	D	1	1										1			1	
Tuticorin	C	1	1	1													
Vizagapatam	C																1
India (French):																	
Chandernagor	C	2	1	5	7	3	2	1		3		1			1		
	D	3	1	5	6	3	2			3		1			1		
Pondicherry	C	31	19	100	100	5	3	5	11	3	8	2	4	1			
	D	21	11	34	18	1	3				3		4	1			
India (Portuguese)	C	1															
Indo-China (see also table below):																	
Pnompenh	C		4	9		1	1							1			
	D		2	5	1			1		2				1			
Saigon and Cholon	C	9	6	4	5	2	3	7	15	25	23	34	22	15	16		
	D	4	3	4	5		3	6	13	20	18	25	13	9	14		
Persia: Rafsandjan	C									31							
	D									12							

Philippine Islands: [1]																	
Iloilo	C	1	2														
	D	1	2														
Provinces—																	
Capiz	C		59	186	48		3	8	18	11	3		3	4			
	D		47	146	41		3	8	13	11	3		1	4			
Iloilo	C	28	145	95	7									8	7	5	6
	D	22	110	65	4									6	5	6	4
Masbate	C				21												
	D				9												
Negros, Occidental	C	120	90	4													2
	D	97	56	4													1
Negros, Oriental	C		1														
	D		1														
Pampanga	C									1							
Samar	C	17															
	D	9															
Siam	C	2	3	1	10	1	1	1	13	11					1	3	
	D	2	1		2				4	3					1	1	
Ayudhaya District	C				1												
Bangkok	C	2	3	2	3	1		1	1	1	1	1					
	D	2	1	1	2			1	1			1					
Bismulok Province	C				8												
	D				2												
On vessel:																	
S. S. Arankola, at Rangoon from Calcutta	C												1				
S. S. City of Eastborne, at Calcutta from Cocanada	C													1			
S. S. Tairea, at Penang from Calcutta	C														1		

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
				1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31
Indo-China (French) (see also table above):															
Cambodia [2]	C	22	26	28			7	19	36	71	35	19	14		65
Cochin-China [2]	C	28	13	8			7	4	13	5	5	19	39		33

[1] Figures for cholera in the Philippine Islands are subject to correction.

[2] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar 8–Apr. 4, 1931	Week ended— April, 1931: 11	April, 1931: 18	April, 1931: 25	May, 1931: 2	May, 1931: 9	May, 1931: 16	May, 1931: 23	May, 1931: 30	June, 1931: 6	June, 1931: 13	June, 1931: 20
Algeria:																
Algiers	C	1	2	1	1											
	D				1											
Bone	C		1											1		
Constantine, vicinity of	C	50	1	1												
	D		1													
Philippeville	C	1														
	D	1														
Argentina:																
Cordoba Province	C		1	2												
Entre Rios Province—Diamante	C			2												
Jujuy Province—Palpala	C		1	1												
Santa Fe	C			2												
Belgian Congo	C				2										1	
	D				2										1	
British East Africa (see also table below):																
Tanganyika	C	2		22	8			3	15	17	5					
	D	2		4	1			10	11	11	2					
Uganda	C	67	25	15	19	8	3	10	14	11	33					
	D	67	24	15	19	8	3	9	12	11	26					
Ceylon: Colombo	C	9	8	11	8	1	3			1						
	D	9	6	13	7	1	2			1						
Plague-infected rats			2	3	4		1					5				
China: Amoy	C									1						
	D									1						
Dutch East Indies:																
Batavia and West Java	C	239	180	141	84	19	24	20	11	18						
	D	238	168	128	80	18	23	20	10	18						
East Java and Madura	C		4	1	4			1		1						
	D		4	1	4			1		1						
Java and Madura	D	615	427	376	277	58	73	70	42	47	41					
Egypt:																
Alexandria	C	3	1	2	1										2	3
	D															3
Plague-infected rats		1	1	1												

Assiout	C	7	26	41	18	5	16	8	3	4	5	8	1	4		
	D	1	6	11	6		11	4	2	2	4	1				
Beni-Suef	C		1					10	2	3		2				
	D		1					3		1		2				
Cairo	C				1											
Deirout	C		21	16					3	7	1		2	3		
	D		4	4					1	2	2			1		
Gharbieh	C		1												1	
	D		1												1	
Girga	C	7	1		86	31	9	4		1	1	5				
	D	2	1		24	13	3	5	1	1	1					
Kena	C				5			3				1				
	D				2			1				1				
Manfalut	C	23	30	15	17											
	D	5	6	5	3											
Minieh	C		2		3		1			5		1		3		
	D		1		2					2		1		1		
Port Said	C														1	
Hawaii Territory: Hamakua—Plague-infected rats												1				
India	C	3,740	5,335	5,457	9,139	2,503	1,603	1,258	778							
	D	2,226	3,422	3,661	7,037	1,980	1,377	1,092	750							
Bassein	C	2	4	1					1			1				
	D	1	3	1					1			1				
Bombay	C		1	1	4	4	4	1	2	5		1	1			
	D		1	1	3	4	4		3	4	1	1				
Plague-infected rats		38	34	32	70	34	43	30	30	26	30	17	21	10	10	
Calcutta	C					1	1									
	D					1	1									
Madras Presidency	C	220	312	74	28	3				1	1					
	D	154	182	46	21	2					1					
Rangoon	C	2	2		1	1				1			1			
	D	1	1		1	1				1			1			
Plague-infected rats		2	4	8	1	1	3			1	1	3	2		3	
Indo-China (see also table below): Pnompenh	C	1	7	1										1		
	D	1	7	4	6	2	1	1						1		
Iraq:																
Baghdad	C		5	3	8		5	10	8	7	10	4	2	10	6	1
	D		4	2	5		2	5	1	3	4	2		1	4	1
Maudhan	C												2			
Madagascar (see also table below): Tamatave	C	2	9													
Morocco	C	19	13													
	D	8	4													
Nigeria: Lagos	C	5	1			2	2	1								
	D	5	1			2	2	1								
Plague-infected rats		5				3	3									
Peru (see table below).																
Senegal (see table below).																
Siam	C		4	18	31	1				1						
	D		2	14	7	1				1						
Bangkok	C	3	8	6	29											
	D	3	8	5	6											
Nagara Rajsima	C	17	9	7	1											
	D	10	10	6												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	April, 1931: 18	April, 1931: 25	May, 1931: 2	May, 1931: 9	May, 1931: 16	May, 1931: 23	May, 1931: 30	June, 1931: 6	June, 1931: 13	June, 1931: 20
Syria: Beirut	C	1	1	1												
Tripolitania	C		8	1	1											
	D		3													
Tunisia: Tunis	C	13	1	14	10	5	7		4	7		8	1			
	D			7	4	4	2		2	3						
Union of Socialist Soviet Republics:																
Gouranduz	D		28													
Transcaucasia—Karabakh	C		6													
Union of South Africa:																
Cape Province	C					2	1									
Orange Free State	C	2	P	1	6	1	1									
	D	2		1	1	1	1									
On vessel: S. S. Marionga. Thermiotis at Avonmouth	C	1														

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
British East Africa (see also table above):							
Kenya	C	50	69	21	7	345	209
Indo-China (see also table above)	C	1			4	2	
Madagascar (see also table above):							
Ambositra Province	C	95	100	92	70		
	D	87	96	88	66		
Antisirabe Province	C	27	66	84	83		
	D	26	57	79	74		
Miarinarivo Province	C	18	28	31	19		
	D	18	26	29	19		
Moramanga Province	C	13	7	7	1		
	D	11	5	7	1		
Tananarive Province	C	178	92	145	90		
	D	172	89	139	81		
Peru	C	41	29	12			
	D	13	8	6			

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Senegal:							
Baol [1]	C						4
	D						3
Dakar [1]	C					2	63
	D					1	49
Louga [1]	C				14	1	5
	D				6		2
Rufisque [1]	C			2			1
Thies [1]	C	2					
	D	1					
Tivaouane [1]	C	2				1	9
	D	1					7

[1] Reports incomplete.

SMALLPOX

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931 14	21	28	April, 1931 4	11	18	25	May, 1931 2	9	16	23	30	June, 1931 6	13	20
Algeria:																			
Algiers	C	1	1	1			2			2					1				
Bone	C		1																
Constantine	C					1							1						
Arabia: Aden	C		1	1															
Belgian Congo	C	79	50																
Belgium	C			1															
Brazil: Porto Alegre (alastrim)	C		3	7	7	12	16	14	20	19	8	6	2						
	D			1				1											
British East Africa (see also table below):																			
Tanganyika	C	84	70	91	6	2													
	D	4	5	13	1	2													
British South Africa: Southern Rhodesia	C	18	13																
Canada:																			
Alberta	C	19	7	1															
British Columbia	C	3	2	8															
Manitoba	C		1	1															
Winnipeg	C	1		1									4						
Nova Scotia	C		1				1												
Ontario	C	17	49	29	2	3	3	1	4		6	7	17	5		3		4	
Kingston	C	6	1	1							2	3							
North Bay	C	2		1															
Ottawa	C	2	3	1															
Sault Ste. Marie	C	1	30	2					3	1				1					
Toronto	C				1		1			4			1						1
Quebec	C		2																
Saskatchewan	C		38	63	40	10	8		5	16	3	22	7	15	18	8	7	16	
Regina	C			1			2				2		2						
Canary Islands: Las Palmas	C						1												
China:																			
Amoy	C						1					2	2	1	1	2	1	2	
	D						1					1	1		1	1	1	1	
Canton	C			3	1	2	2	2	1	2	1				1	2			
Chungking	C	2																	
Foochow	C	P	P	P		P		P	P			P							
Hong Kong	C	1	1	9			1	1		1	2					1			
	D			3			2				1		1			1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931 14	21	28	April, 1931 4	11	18	25	May, 1931 2	9	16	23	30	June, 1931 6	13	20
China—Continued.																			
Manchuria—																			
Harbin	C		1	4	1		1												
Kwantung—Dairen	C	1					2				1	1	1			1			
Nanking	C	P	P	P		P	P	P	P	P	P	P	P	P	P				
Shanghai—																			
Foreigners only	C	14	12	16	3	1	1	1	2	1	2	2	1	4	1	1	2		
Including natives	D	11	13	14	5	2	2	1	2	7	4	5	1		3	3	1	5	
Swatow	D	5	7	13	3	6	9	8	2										
Tientsin	C		1										2						
Chosen (see table below).																			
Colombia: Cali	D												1						
Dutch East Indies:																			
Batavia and West Java	C	4	29	2	1														
	D	2	2	1															
East Java and Madura	C															1			
Finland	C									1									
France (see table below).																			
Great Britain:																			
England and Wales	C	665	958	745	171	219	226	179	177	163	212	192	186	166	111	107	83	94	
Bradford	C	1	4	1		1		1	1		1	4	1	3	1	3			
Leeds	C	2						1		1	1		1		1				
London	C	161	140	98	26	54	32	35	51	39	84	53	66	44	37	36	25	50	
London and Great Towns	C	560	693	683	117	154	166	117	142	126	162	128	139	108	84	72	57	84	
	D			1					1		1						1		
Sheffield	C		3	32	2	1	6	1	4	2	1								
Stoke-on-Trent	C		1	1															
Greece (see table below).																			
Honduras:																			
Amapala	C			1															
Ocotepeque and Gracias districts	C			P															
Puerto Castilla	C	4	11	3															
Tegucigalpa	C										1								
Tela	C								1										

India	C	5,623	9,623	12,222	3,440	1,695	3,395	3,261	3,980	3,749	3,468	3,068							
	D	1,381	2,245	2,660	655	303	655	638	807	684	680	752							
Bassein	C															1			
Bombay	C	2	7	6	4	1	4	1	2	2	1	3	3		6	1		2	
	D	2	1	3		1	2	1	1			4	1	1	1	1		1	
Calcutta	C	59	143	251	53	69	75	86	101	60	61	65	24	30	19	16	14	19	
	D	40	100	188	36	54	50	63	78	42	50	54	18	25	17	15	12	18	
Cochin	C	15	29	59	15	17	14		10	11	12	6	3						
	D	1		3															
Karachi	C		3	4		3		1		5		1							
	D		2				2												
Madras	C	4	16	8	6	3	9	4	12	4	1	2	1	3	3	1			
	D			1		2	1		2	1	1	1		1	5				
Moulmein	C		2																
Negapatam	C								1	1		1							
Rangoon	C			4	1	1	1		2	2	1	6	7	5		1		1	
	D				1							1	2	1	1	1		1	
Vizagapatam	C		1	8	1		1		2	2	4	2			5	1	2		
	D			2			1		1		1				1				
India (French):																			
Chandernagor	C	5	9	12	3	3	6	2	3	1	4	2	3		4				
	D	3	1	1				2	3	1	2	1	3		2				
Karikal	C	3	5	19			3			1	1	2	1	1	1	1	1		
	D	2	4	18						1		2	1	1	1	1	1		
Pondicherry Province	C	34	45	19	7		4	3	3			3	1	2	7	1	3	2	
	D	32	45	19	7		4	3	3	3		3	1	2	7	1	3	2	
India (Portuguese)	C	4	5	14		3	5			19	2								
	D			3		1	2			4	2								
Indo-China (see also table below):																			
Pnompenh	C	2	1		1										1		2		
	D		1												1				
Saigon and Cholon	C		6	4	4	1	1	2	1					1		1			
	D		4	1	3	1	2	2	1					1					
Iraq:																			
Baghdad	C			9							1	1			1	2			
	D															2			
Basra	C															2			
Mosul Liwa	C	1	3	5															
	D			1															
Ivory Coast (see table below).																			
Japan:																			
Kobe	C			2															
Taiwan	C		1																
Mexico (see also table below):																			
Jalisco (State)—Guadalajara	D		1				1					1	1		1			1	
Mexico City and surrounding territory	C	10		23	13	13	7		17	9	11	6	4	10	10	21			
	D	6	1	8	5	5	6	6	4	6	4		4	3	2	2			
Monterrey	C																1		
Torreon	C									1				1					
	D									2									
Vera Cruz	C			3		1	1			1		1	1						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931					June, 1931		
					14	21	28	4	11	18	25	2	9	16	23	30	6	13	20
Morocco (see table below).																			
Nicaragua: Porto Cabezas	C	2																	
Nigeria: Lagos	C						2												
Panama Canal Zone	C		2																
Poland	C	25		1												3	1	1	
Portugal: Lisbon	C	72	103	40	16	15	17	4	8	18	11	19	19	14	16	18	5	17	
Siam	C	1	4	2							1			3					
	D	1																	
Spain	C	P	P	P	P	P	P												
Straits Settlements	C	6	7	2			2	2	1		1								
	D	3	1	1			1		1	1	1								
Sudan (Anglo-Egyptain)	C	64	11	97	3	1	4					3		3		1			
	D	6	7	10		1	1									1			
Sudan (French) (see table below).																			
Syria (see table below).																			
Tunisia: Tunis	C	17	8				4												
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P			P	P	P	P	P		P	P					
Orange Free State	C		P	P			P	P	P	P	P		P	P					
Transvaal	C	P	P	P	P		P												
Upper Volta	C	4		18			3			3			1	2		85			
	D	2					1									1			
On vessel:																			
S. S. Clan MacTaggart at Suez	C			2															
S. S. Muncaster Castle at Manila from Hong Kong	C	1																	
S. S. Matheran at Suez from Calcutta	C		1																
S. S. Clan Buchanan at Suez	C			2															
S. S. Rotterdam at Naples from Venice	C						1												
S. S. Clan MacTavish at Manila from Chittagong	C									1									

S. S. Benvenue at Sydney from Shanghai C		1															
S. S. Clan MacBrayne at Cochin C			1														
S. S. Chilka at Rangoon C			1														
S. S. Taif (pilgrim ship) at Suakin from Jeddah C											1						
S. S. Talodi at Soakim C													1				

Place		October, 1930	November, 1930	December, 1930			January, 1931			February, 1931			March, 1931		
				1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20	21–28	1–10	11–20	21–31
Indo-China (see also table above)	C	258	86	38	9	14	47	48	46	95	46	27	12		139
Ivory Coast	C	4	2	9											
Sudan (French)	C	17		43		96							4		P
	D	2		16		4									
Syria: Beirut	C							1							

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen	C		1		11			Mexico (see also table above)	D	1		3		1	1
	D		1		3			Morocco	C	25		4	6	7	49
France	C		4	16				Turkey	C	116	63	37	1		9
Greece	C	4		4					D	9	7	6			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 14 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931					June, 1931		
					14	21	28	4	11	18	25	2	9	16	23	30	6	13	20
Algeria:																			
Algiers	C			2			3				2	1	3		1	3	4		
Constantine Department	C	6	31	4		1		2	2		6	1	8	3	5	6	6		
Oran	C		3	1							1					2	2		
Australia, Western	C							1					1						
Bulgaria	C	1	13	5				9		26	4			5	8	3	11		
	D							2		3				1		3	2		
Chile: Valparaiso	D			1															
China:																			
Canton	C		2		1														
Manchuria—Harbin	C		3	5			3				8								
Shanghai	C		2																
Tientsin	C								1	1									
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C									1								1	
	D										1								
Beheira Province	C	1							3	1									
	D	1							2										
Cairo	C	1	1																
Port Said	C		1																
Eritrea: Asmara	C				1														
Great Britain: Scotland	C		1																
Fife County	C															1			
Glasgow	C		2																
	D		1																
Greece (see table below).																			
Guatemala.[1]																			
Iraq: Baghdad	C			5	1		1						2						
	D			1									2						
Irish Free State:																			
Cork County—Skibbereen	C																	1	
Kerry County—Dingle	C												1						
Mayo County—Belmullet	C									1									

Place																			
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico (see also table below):																			
Durango	D		1																
Mexico City, including municipalities in Federal District	C	12	39	35	46	66	73	31	67	34	38	31	16	27	17	15			
	D	10	34	16	20	13	31	20	18	7	17	11	9	7	7	10			
San Luis Potosi	D			5	1	1	2	1	1	2					1	1			
Morocco	C	8	8	28	2	2	3			1		12		13	29			31	
	D		2	1								1		2	2			2	
Palestine	C	4	2	3	2	1	1	1	1	2		2	2	1	1			2	3
Panama Canal Zone—Balboa	C													1					
Paraguay: Asuncion	D		4	1	1														
Poland	C	63	106	189	62	58	85	82	93	176	140	129	92	81	55	67		45	
	D	3	8	19	4		7	4	8	7	6	7	6	4	5	3		2	
Portugal: Oporto	C		1																
Rumania	C	113	193	152	55	53	52	54	70				63						
	D	5	16	24	4	5	3	4	8				10						
Syria	C													1	3				
Tunisia:																			
Sbeitla, vicinity of	C							20	2			10							
	D							7											
Sfax	C						2												
Tunis	C		16	18	5	2	7		3		1	10	12	9	6			64	
	D												1	2					
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	1		P	P	P	P	P		P	P					
Municipality of East London	C	3	3				P	P											
Natal	C	P	P	P		1	P	P	P	P	P	P	P						
Orange Free State	C	P	P	P	P				P	P	P			P					
Transvaal	C	P	P	P	P		P	P	P	P	P		P	P					
Yugoslavia (see table below).																			

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Chosen: Seoul	C	1	1	1		3	4
Czechoslovakia	C	16	24	60	26		5
Greece	C	4	10	10	17	8	22
	D			2	2	1	3
Latvia	C				12		

Place		Nov., 1930	Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931
Lithuania	C	5	6	26	3	22	32
	D	1	3	3	1	2	3
Mexico (see also table above)	D	47	47				
Turkey	C	3	2		18		
Yugoslavia	C	2	1	20	12	10	43
	D		1	2		1	5

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reported an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931					June 6, 1931
					14	21	28	4	11	18	25	2	9	16	23	30	
Brazil:																	
Bahia State	C				1	1											
Ceara State	C		1		2							2		1			1
	D		1									2		1			
Minas Geraes State	C					2			1		2	2	1		1		
	D					1					1	1	1				
Rio de Janeiro State	C					1								1	1		
	D			1	1	1											
Cambucy	C		3	2	1												
	D		3	1													
Friburgo (imported)	C		1														
Padua	C		2	1													
	D		2	1													
British Cameroons: Mamfe	C													3			
	D													2			

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PUBLIC HEALTH REPORTS

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THE PHYSICAL EXAMINATION AS AN INSTRUMENT OF RESEARCH[1]

By ROLLO H. BRITTEN, *Senior Statistician, Office of Industrial Hygiene and Sanitation, United States Public Health Service*

In research investigations, the determination of the physical fitness or condition of a group of persons, whether they be workers or subjects in some physiological experiment, has proved a difficult problem. No simple solution is to be expected. Health has no single touchstone. We must piece together information from whatever source it can be obtained and, of course, must always have an eye on the precise nature of the investigation itself. Where a study permits determination of a few specific effects—as those of lead or silica dust or of radium—the problem is much simplified, especially if laboratory or röntgenological methods are available. But it not infrequently happens that one is concerned with the general or broad effect on health, as that of high temperature and humidity in the work place, and then all possible means of measuring physical condition must be brought into play—mortality, sickness, and the general physical examination.

These points are generally recognized, but insufficient attention is given to making each instrument as precise as possible from a research point of view. The present discussion is an attempt to indicate some principles by which the general physical examination may be given sufficient accuracy to serve as a scientific instrument. Only the principles can be set forth at this time. The periodic health examination should obviously be developed along the same lines, both to make successive examinations reasonably comparable and to give real value to the statistical results.

Advancement of scientific knowledge rests to a large extent on the improvement of technique; but we are a little loath to catch the full significance of this fact. So long as a physician conducts an examination which will, clinically, ascertain anything seriously wrong with an individual, he is inclined to feel satisfied. A great deal of difficultly acquired technique has been employed in making such an examination, but customarily no two doctors have followed the same procedure. From an ideal standpoint, perhaps, no two doctors can follow the same procedure, except with respect to a few quantitative phases

[1] Discussion given before Philadelphia County Medical Society, Mar. 25, 1931.

of the examination. Practically speaking, however, it would seem that a degree of standardization is possible. Certain it is that, unless a fairly uniform technique is available, the general physical examination performed by different physicians is not an instrument of research at all.

It must be made clear that the demands of analysis of data collectively are different from the absolutely necessary demands of clinical medicine. The physician, examining a person in order to be of individual help to him, may feel that he need not be concerned if his standard as to what is an enlarged tonsil differs from that of another doctor. After all, he is looking for definitely pathological conditions—matters of importance to the general health of the patient. He can call attention to, or overlook, minor degrees of impairment without its making any particular difference in the recommendations he will make to the individual. He will probably not fail to note any really serious and practically determinable condition. But the statistical results largely depend on the minor degrees of impairment, because these are the conditions which are so much in the majority.

The tendency of minor impairments to outweigh the more serious ones in the statistical results is of such great importance that I should like to be quite specific about this point. It is difficult to give examples with respect to the conditions usually found in the course of the examinations, because the degree is determined only in a qualitative way. But suppose one considers the percentage of persons found to have arteriosclerosis of different degrees in certain examinations we have analyzed. These percentages are 20 for slight; 4 for moderate; and 0.24 for marked. In other words, for every one classified as marked there were nearly 100 classified as slight. Clearly the rate of prevalence of arteriosclerosis, unless we limit ourselves to marked cases, is determined almost entirely by the doctor's interpretation of what the border line is between no case at all and a slight case. I have taken an instance in which it is customary to express the results in degrees. Suppose we consider, instead, weak inguinal rings, where no such separation is customarily made. Eleven per cent are given as having weak rings. To me this percentage is a hazy and unreal thing, because it is determined almost entirely by cases on the border line between the purely normal and the pathological—the no-man's land of uncertainty in the doctor's diagnosis.

I should like also to give an example from some quantitative results—the hemoglobin percentage. We would not entirely agree as to what limits are to be set to the normal range. Similar data to those which I quoted in regard to arteriosclerosis give 36 per cent with readings under 83; 13 per cent with readings under 78; 3 per cent with readings under 73; and 0.4 of 1 per cent below 68. If one doctor should set a limit of 83 he would find three times as many

abnormal conditions as if he set the limit at 78. In quantitative data, which has simply been used as a hypothetical example, an arbitrary limit can be set or the distribution can be given; but in very few phases of the physical examination is this possible.

We have been accustomed to think of rates of impairments as having the same validity as mortality rates. But a death is a real thing whether its cause can be properly set down or not. Even sickness rates of a communicable disease such as smallpox are quite real, because for the purpose of our argument we can say that a case is a case. The gradual shading off into normality does not work the same havoc to our statistics that it does in the prevalence rates based on physical examinations. Reasons for such shading off are about as many as the number of conditions looked for. Sometimes they are inherent in the impairment (as in enlarged heart, when no two people have the same size of heart); sometimes in the difficulties of technique (as in pulmonary tuberculosis); sometimes in the differences in the subject's response (as in history). Whatever the precise reason, I feel that under present conditions we are discussing an unsubstantial and usually unreal thing when we say that the rate of enlarged or diseased tonsils is 26 per cent; or that 6 per cent have pyorrhea; or that 17 per cent have frequent colds. Relative comparisons—from age to age, from occupation to occupation—may in some instances have meaning, but hardly the actual rates.

The difficulty, as you will see, will affect, likewise, the recorded incidence of really serious conditions. One physician may record as severe, cases which another doctor would record as moderate, so that the results will reflect primarily a difference in the point of view of the individual doctor. Even where a single doctor examines both groups, he must have rigorous standards indeed if they do not gradually undergo a change during the making of a large number of examinations, a change which he usually does not realize himself.

Examples of the difficulty of securing comparable results from physical examinations could be cited from a hundred investigations. One is particularly appropriate, however, because different groups of physicians were employed in making these examinations in different industries.[2] In one industry 34 per cent were recorded as having enlarged tonsils and 25 per cent as having diseased tonsils; in another industry these percentages were 31 and 29; in another, 29 and 44. There is a good deal of consistency in these results. On the other hand, one industry had percentages of 4 and 2; another of 7 and 1; another of 7 and 0. These extreme differences are in all probability not due to any peculiar industrial factor, but to a difference in the standards of the examiners in each industry. It is perfectly obvious

[2] A health study of ten thousand male industrial workers. Statistical analysis of surveys in ten industries. By Rollo H. Britten and L. R. Thompson. Public Health Bulletin No. 162 (1926).

that, even if some industrial difference did exist with respect to this or some other condition, it would be entirely obscured by the great variation in the results due to the difference in the standards of the examiners.

It takes an optimistic soul indeed to hope to standardize the making of physicial examinations in the face of such discordant results; yet, if such examinations are to be regarded as an instrument of research at all, something must be done in that direction. What is aimed at in this discussion is to point out the necessity for such standardization, and to suggest a few principles along which progress would seem to lie. These principles may be set down forthwith:

1. *No impairment can be regarded as susceptible of quantitative analysis unless we can be sure that the condition has been looked for in each individual.*

We can not assume that it has been looked for unless the condition is specifically mentioned in the form and checked as negative (or otherwise) by the examiner. Thus, a rather detailed form is necessary. This requirement is more or less contrary to the methods of clinical medicine; but it is felt to be absolutely fundamental so far as collective data go. We must know that the doctor has weighed the question as to whether each particular condition is present. A complete form is not a guarantee of this; but it is a first necessity.

2. *Most impairments encountered in examinations are matters of degree, varying from nonpathological deviations from the normal to conditions requiring immediate treatment.*

As I have intimated, it is quite possible that it is a meaningless question to ask: What is the percentage of persons with flat feet? Where a physical condition varies from an extremely serious impairment to one that can not be separated from the normal, these percentages begin to lose all meaning. In dealing with this problem, some statement of the degree is all that is possible for items which can not be reduced at the present time to a quantititive basis. The following is suggested as a basis for such a statement:

O Normal.
OO Corrected.
X Abnormal, but not pathological.
XX Definitely pathological.
XXX Severe.

Notice here that the question is left to the examiner as to whether the condition is pathological or not. Certainly if the examiner does not know, the coder in the office will not know.

3. *It is necessary that these degrees mean more or less the same thing to the different examiners.*

To accomplish this end, exactly the same procedure must be followed in ascertaining the presence and degree of every impairment. This requires the preparation of a set of definite instructions and a short but intensive training of the examiners in each detail of the physical examination. An excellent procedure would be to have several doctors examine the same individual independently and compare their results.

It is not within the scope of this paper to outline the precise technique to be followed in the case of each condition; but no one point is to be emphasized more strongly than the necessity of having that done. As an example, take the condition of pyorrhea. It will not be sufficient to ask the examiner to record cases of pyorrhea. There must be a definite agreement as to what is meant by pyorrhea, and that interpretation must be kept in mind in any analysis of the data. We might take the rule that the examiner is to press the gum firmly against the teeth and observe whether pus exudes, recording the case as pyorrhea if it does. This is given simply as a suggestion of what is meant by a standardized technique. In a way, in line with a modern point of view in the physical sciences, we are defining these pathological conditions in terms of operations.

4. *The quantitative phases of an examination can be most effectively analyzed.*

Accordingly, physiological measurements, such as hemoglobin, blood pressure, weight in relation to height and age, Snellen test of vision, should be determined. Whenever a condition can be expressed in a quantitative way, this should be done, because this method will go far toward eliminating differences in the doctors' standards.

5. *The examination should be "blind" in so far as practicable.*

What I mean is that, wherever it can be done, the physician should make his examination without knowing whether the subject is exposed to any particular condition under study. He should have a chance to examine "control" subjects without knowing that they are such. This method has been followed in certain investigations with remarkable success. No one thing is so likely to inspire confidence, and rightly, in the results.

6. *A thorough history is necessary, because the examination itself gives only a cross-section survey.*

Since the history must also be analyzed statistically, a definite procedure should be followed with respect to questions as to constipation, frequent colds, chronic bronchitis, and other factors which may bear upon a person's present condition or be connected with any phase of the investigation. The same necessity for rigorous standardization exists here as in the case of the physical examination itself.

7. *The presence of acute conditions at the time of the examination must be allowed for.*

In making the general physical examination for the purposes outlined in this paper, the acute conditions, with certain specific exceptions, are of no moment. In fact, so long as acute conditions are present it is difficult to determine what underlying chronic conditions may exist. A preferable rule would be to examine the patient again after the acute condition has subsided. Where this is impossible, the doctor should, by questioning and observation, find out as to the acuteness or chronicity of symptoms and signs.

8. *A minimum time should be set for each examination.*

Two doctors do not go through an examination at the same rate, but the finding of impairments depends to so great an extent on the thoroughness of the examination, which, in turn, depends on the time taken, that a certain amount of standardization is possible by regulating the minimum time. Where suspicious signs are found, much more time will, of course, be required to determine whether the condition is actually present.

9. *The work, its assembly, and the conclusions should be under the critical eye of one skilled in the various procedures, their interpretation, and the broad phases of human pathology.*

It is easy, otherwise, for mistakes to creep into so complex a mechanism as is this type of research, and it is particularly easy for emphasis to be laid in wrong places unless the details of possible inaccuracies and possible fallacies are duly weighted.

These principles are not given as original. Most of them have been used in different cases in the past and have really proved their worth. Nor are they given as complete; but they should provoke thought.

The application of the principles is not within the scope of this discussion. The difficulty of applying them is thoroughly recognized; but it is felt that the attempt must be made if the general physical examination is to be used in any real sense as an instrument of research.

A NEW SUBSPECIES, RADICANS, OF ALCALIGENES FAECALIS

By Alice C. Evans, *Senior Bacteriologist, National Institute of Health, United States Public Health Service*

According to a recent review of *Alcaligenes faecalis* by Wilson, that organism is frequently found in man's intestine, and may be found in large numbers in cases of enteric fever; but it is rare to find any evidence of its infectivity. Wilson quotes several authors, however, who cultivated it from the blood in cases of diseases resembling enteric fever, and a few of these authors cultivated it from the blood in small groups of cases.

The culture to be reported in this paper is of interest for two reasons: In the first place it was cultivated from the blood in a mild case of fever resembling typhoid. Hence it adds one more to the limited number of cases of enteric disease from which *Alcaligenes* was cultivated from the blood. In the second place it differs from *faecalis* in certain characters. Inasmuch as only one strain has been observed, it will be considered as a subspecies of *faecalis*, although it would be considered a separate species if it represented a number of cultures.

The name *radicans*, proposed for the new subspecies, is derived from *radico*, a Latin verb of the first conjugation meaning "to take root." This name was suggested by the root-like processes which develop beneath the surface growth on gelatin.

The culture was received from Dr. Paul Padget, of the Baltimore City Hospitals, to whom the writer is indebted for the following medical history: The culture was obtained from the blood of a student nurse who was suffering with what appeared at first to be typhoid fever. The serum gave negative agglutination reactions with typhoid and with paratyphoid A and B antigens. Cultures of stools and urine were negative for organisms of the typhoid group. Recovery was prompt, and the patient was discharged perfectly well in two weeks. After her discharge two more similar cases occurred among the student nurses, but blood cultures remained sterile.

MORPHOLOGY AND STAINING REACTIONS

The organism is a nonsporing Gram-negative rod 0.5 by 1.5 to 9 microns, motile by means of peritrichous flagella. In broth culture there are occasional chains of 4 or 5 cells. There is no capsule.

CULTURAL CHARACTERS

On agar slopes, after 24 hours' incubation, growth is moderate, dull, and finely wrinkled, with a few coarse wrinkles near the base of the slope. On further incubation the coarse wrinkles extend over a larger area. The finely wrinkled growth clings to the agar, but the coarsely wrinkled growth may be peeled from the agar as a tough pellicle. There is no pigment formation. Crystals develop in the agar on about the fifth day.

On agar plates the colonies grow to be 0.5 to 1 millimeter in diameter in a day. They continue to grow until the largest colonies may be 8 millimeters in diameter on the fourth day. After one day's growth the colonies appear bluish, in transmitted light, with smooth edges. As they grow larger, the center becomes darker, surrounded by concentric lighter and darker rings. The central disk may be elevated and surrounded by a circular depression, the latter being

surrounded by a raised ring. The outer ring is uniform in texture, with smooth surface and edge; but the ring next to the outside develops regular, fine, radial wrinkles. As the agar dries, tongues of growth may be pushed out, breaking the regularity of the edge.

There is no growth on Conradi-Drigalski agar unless the seeding be heavy, in which case growth is sparse with no change in the color of the medium.

In gelatin medium at room temperature growth occurs only on the surface at first. On about the fourth day the beginnings of rootlike processes may be seen. They appear as papules on the under side of the surface growth. Sometimes there is no further development of these papules, but usually they continue to grow until they appear as branched processes about 2 millimeters long and 1.5 millimeters thick on the eleventh or twelfth day. Liquefaction begins at the surface on about the fifteenth day, and continues slowly downward until about 12 millimeters of the gelatin column has been liquefied.

In broth culture after 24 hours' incubation the medium is faintly turbid, with a delicate ring which readily sinks intact to the bottom of the tube. The turbidity continues to increase for about a week until it becomes very dense, with heavy sediment.

Growth in litmus milk is accompanied by the development of an alkaline reaction which increases for a week or more. There is no growth on potato. Red blood cells are not hemolyzed. The organism is aerobic. Its optimum temperature is 37° C.

BIOCHEMICAL REACTIONS

An alkaline reaction is produced in broth containing dextrose, laevulose, maltose, lactose, galactose, saccharose, mannose, raffinose, rhamnose, xylose, arabinose, starch, salicin, inulin, dulcitol, mannitol, glycerol, sorbitol, erythritol, and inositol.

No growth occurs in synthetic media containing inorganic salts and cystine, tryptophane, or uric acid as a source of nitrogen. No growth occurs in Koser's synthetic citrate medium.

There is no production of acetyl-methyl-carbinol, hydrogen sulphide, or indol.

Growth occurs in 1 per cent Witte's peptone, but it is sparse or absent in a solution of Parke, Davis & Co.'s peptone.

SEROLOGICAL REACTIONS

The new subspecies *radicans* is a weak antigen. As already mentioned, at the time of the patient's illness the serum gave no agglutination reaction with typhoid or paratyphoid A and B antigens. At the time of her illness no serologic tests were made with the patient's serum and the organism cultivated from the blood. A

sample of serum taken five months later gave a negative agglutination reaction with this organism. Agglutinins were produced in the serum of two rabbits to a titer no higher than 1 to 160 after 3 and 5 injections, respectively, of living culture. *Alcaligenes faecalis, Eberthella typhi, Salmonella paratyphi, Salmonella schottmülleri,* and *Escherichia coli* were not agglutinated in these rabbit serums. The organism in question was not agglutinated in high titer serums prepared with antigens of the five mentioned organisms, respectively.

PATHOGENICITY FOR EXPERIMENTAL ANIMALS

On the day after receiving the culture two guinea pigs were inoculated with broth cultures, the first transfer from the original. Each animal was inoculated intraperitoneally with 1 cubic centimeter of broth culture, and intrapleurally with the same dose. One animal died on the sixth day. There was a mild peritonitis, and the omentum was congested, with a small hard abscess near the stomach. The inoculated organism was recovered in pure culture from the abscess. The other guinea pig was killed on the fifteenth day, and the organs were examined without finding evidence of disease. Two or three weeks later, further inoculations were made without results. A guinea pig was inoculated intraperitoneally with the washings from a young agar culture. The animal was killed on the seventh day and the organs were examined without finding evidence of disease. There was no evidence of disease during life in the two rabbits repeatedly injected intravenously with living culture for the preparation of the antiserum, nor post-mortem in one of these rabbits bled to death on the fourth day after the last inoculation. Two mice were injected intraperitoneally with broth culture without results. The results of tests for the pathogenicity of the organism for experimental animals may be summarized with the statement that soon after isolation it was found to be mildly pathogenic for a guinea pig. This pathogenic property appeared to be lost under artificial cultivation, for after a few weeks' cultivation it was nonpathogenic for rabbits, mice, and a guinea pig.

TABLE 1.—*Comparison of the distinguishing cultural characters and biochemical reactions of the type species* faecalis *and the new subspecies* radicans *of the genus* Alcaligenes

Medium	*A. faecalis*	*A. faecalis radicans*
Agar slope	Smooth, glistening	Dull, wrinkled.
Conradi-Drigalski agar	Good growth with alkaline reaction.	No growth unless the inoculation is heavy, in which case the growth is meager.
Gelatin	Surface growth with no liquefaction.	Rootlike processes develop downwards from the surface growth. Later there is slow liquefaction.
Broth	Growth rapid, with pellicle	Growth slow, with ring.
Potato	Brownish growth	No growth.
Synthetic media	Growth	No growth.
Peptone (Park, Davis & Co.) water.	Growth	Growth is sparse or absent.

DISCUSSION

A comparison of the distinguishing cultural characters and biochemical reactions of the type species *faecalis*, and the new subspecies *radicans* of the genus *Alcaligenes* is summarized in Table 1.

In the literature on *Alcaligenes faecalis* there was found a description by Straub and Krais of a strain isolated from the blood in a case of enteric disease. Their strain appears to hold an intermediate position between the species *faecalis* and the subspecies *radicans*. It grew less luxuriantly than the typical *faecalis*, and it liquefied gelatin. Their strain differed from *radicans* in growing meagerly on potato, and in liquefying gelatin rapidly.

REFERENCES

Straub, H., and Krais, W. (1914): Bacillus faecalis alcaligenes als Krankheitserreger. Deutsch. Med. Woch., 40, 380–382.

Wilson, W. J. (1929): The B. alcaligenes group. *In* A System of Bacteriology, London, 4, 298–308.

EFFECT OF FUMIGATION ON COCKROACHES ON SHIPS

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The cockroach discussed in this paper is *Blatella germanica*, which is by far the most important cockroach pest on ships seen at New York.

REASON FOR INVESTIGATION

It has been known to fumigators for years that cockroaches often are not eradicated by fumigations effective against rats.

The destruction of cockroaches on shipboard is not a recognized quarantine procedure, though it occurs incidentally in the destruction of rats by fumigation. So far as known, their destruction serves no specific quarantine purpose. From the viewpoint of the quarantine officer, therefore, the fumigation of cockroaches is not now considered a matter of great importance.

From the viewpoint of the shipowners and operating personnel the destruction of insect pests, particularly cockroaches, is the popular criterion by which the effectiveness of fumigation is judged. To them rats are more or less incidental, while the cockroaches occasion direct personal concern. The rats are usually confined to the holds and unoccupied portions of the ship, but cockroaches, while often numerous in the holds, as a rule congregate in the living quarters.

It is not surprising, then, that ship operators have questioned the effectiveness of quarantine fumigations nor that their criticisms should be given credence by those unacquainted with all the facts. On the other hand, it is not logical, nor justifiable from a quarantine

standpoint, to incur the additional expenditures required to kill cockroaches when their destruction does not serve a definite disease-preventive purpose.

To determine if possible a reasonable course between the two horns of this dilemma has been the object of the experiments reported herein.

RESTRICTIONS OF METHOD

Commercial fumigators kill insect pests by long exposures. In quarantine fumigation, however, exposure for the destruction of rats is generally limited to two hours. Obviously, therefore, it is desirable to find a method that kills insect pests in this time.

Cockroaches reproduce through eggs which are protected in egg cases. To kill the eggs is much more difficult than to kill the free running forms. The usual method in attempting complete eradication is to follow fumigation by refumigation, two to six weeks later, to kill the cockroaches that have hatched in the meantime. In quarantine work, results must be secured with a single fumigation. With hydrocyanic acid at approximately $1 a pound, any material increase in the amount of fumigant would not be justified. It will be seen by viewing these conflicting requirements that the chances of satisfactorily solving the problem appear to be small.

A change to some other fumigant has not been considered. This would mean extensive investigation to determine its primary suitability for rat destruction. Any change in the fumigant must come the other way—that is, it must first appear as a better rat-destructive gas.

LITERATURE

No extensive search of the literature has been attempted. So much of it as was examined soon brought to light that nearly all of the work on insect fumigation involved much longer exposures or higher concentrations of fumigant than we were permitted, so that apparently little was to be gained by further study. Among the publications of the Public Health Service only two were noted dealing directly with fumigation for the destruction of cockroaches.

In 1916 Creel [1] carried out limited experiments which indicated that large amounts of cyanide evolved by generative methods were required to kill cockroaches. In 1925 Rice [2] reported complete success in killing cockroaches on ships fumigated with a cyanogen chloride-hydrocyanic acid mixture used for rat destruction, provided fumigated compartments were tightly closed.

[1] Creel, R. H., and Faget, F. M.: Cyanide gas for the destruction of insects. Pub. Health Rep., June 9, 1916.

[2] Rice, C. E.: Destruction of cockroaches and devitalization of their eggs by cyanogen chloride mixture. Pub. Health Rep., August 28, 1925.

CASUAL OBSERVATIONS AND OTHER DATA

The casual, but extensive, observations of fumigators at New York, where cyanogen chloride was used for two years, have been to the effect that this gas was no more effective than other forms of cyanide in killing cockroaches.

For years fumigators have from time to time reported the revival of cockroaches. On numerous occasions cockroaches have been seen to crawl away within an hour after fumigation. Frequently ships' officers have stated that the cockroaches were numerous immediately after fumigation. The writer has learned from representatives of reliable exterminating companies that they regard cockroach eradication as exceptionally difficult. One of the largest fruit companies, despite periodic fumigations of their ships with large amounts of cyanide, uses quantities of insecticide powders between fumigations.

It is the personal observation of the writer that ships' holds are often infested, sometimes very heavily, with cockroaches. These vessels carry permanent reservoirs of infestation which continually reinfest the superstructure compartments. Cockroaches are frequently found between the tarpaulins covering the hatches.

Cockroaches, like rats, congregate most where food, water, and harborage are most accessible.

HARBORAGE AND INFESTATION

The amount of cockroach infestation may be very great. It is not unusual to kill approximately 20,000 to 50,000 in a forecastle (crews' quarters), while more than 20,000 have been taken from a single small stateroom.

Heavy cockroach infestation is usually obvious on even casual inspection, but sometimes close search is required to demonstrate a lighter degree, while the true extent of infestation of any grade is often apparent only after examination of the more remote hiding places.

During the day, cockroaches generally hide in dark places. The preferred refuge is a crack just wide enough for them to crawl into. On ships there are spaces between sinks and the wooden sheathing around them. The spaces between drawers and their casings are favored; and, strange to say, electric switch boxes sometimes harbor a thousand or more. In a forecastle, cockroaches may be found in the bedding and in the corners of the men's lockers. In a mess room they may gather on the underside of the table and under the permanent seats. Often they are found behind pictures and mirrors, when these are loosely attached to the wall, and at times appear in the folds of clothes, in shoes, in suitcases, and, in fact, in any place away from the light and not subject to frequent inspection.

MATERIAL USED

For laboratory experimentation large numbers of cockroaches were collected by light fumigation of infested compartments on ships. Small amounts of HCN stupefy these insects so that they can be readily gathered. Within a few hours most of them recover. In the laboratory those collected were put into a stock cage, which received fresh lots every few days and in which breeding was continuous. From time to time they were taken from this cage for experimentation.

Compartments on shipboard found heavily infested were fumigated under various conditions. The cockroaches gathered up after fumigation were taken to the laboratory for observation.

Fumigation tests were made with liquid HCN (hydrocyanic acid); liquid HCN containing chloropicrin (warning gas); Zyklon–B; and chloropicrin. Cyanogen chloride has not been included, since this material is no longer in use at the New York quarantine station. It is expected later to test the effect of this fumigant and of HCN produced by generation.

After establishing that the cyanogen content in mixtures containing chloropicrin was the important factor, most of the subsequent tests were made with liquid HCN, on account of the ease of measurement. In comparing this with HCN produced by generation, it should be borne in mind that, theoretically, it requires 4 ounces (130 gm.) of sodium cyanide to produce 2 ounces (60 gm.) of HCN; but, practically, there is a variable amount of HCN gas liberated by generative methods.

APPARATUS

All fumigations in the laboratory were done in large glass animal jars, closed by waxed paper stretched across the tops. Methyl orange test papers laid on the covers showed the loss of HCN during exposure to be very slight, a distinct pink color rarely appearing in less than 30 minutes.

In some experiments harborage was furnished by spreading in the bottom of the jar a 1-inch layer of fine wood shavings (planing machine chips) over which were placed four layers of folded cloths and six layers of loosely folded and crumpled newspapers. When given harborage, cockroaches were always allowed three days to become used to it before being subjected to fumigation. During this interval a cloth cover was substituted for the waxed paper.

By chance the cubic contents of the jars used were such that 0.1 c. c. of liquid HCN produced a concentration of 30 gm. (approximately 1 oz.) per 1,000 cubic feet. This greatly facilitated the mechanics of the experiments, since most of the doses utilized were multiples of 30 gm.

The stock cage was made of a tight wooden box covered at the top with very fine brass wire mesh (carburetor gasoline filter screening). (Only a fine mesh will stop the very young cockroaches.) Through the center was set a tin can 4 by 8 inches (a coffee can was used) from which the bottom had been removed. The wire mesh was soldered to the can at the middle so that the latter projected 4 inches into the box and an equal distance above it. The sleeve entrance thus produced was almost proof against the escape of the cockroaches but permitted relatively easy access. It could be entirely closed by a snugly fitting cover. Cockroaches were removed by inserting a small, wide-mouthed bottle, passing the open mouth over the corners and angles, covering it with the hand, and then withdrawing, bringing out as many as 50 at a time.

OBJECTS

The points to determine were as follows:

1. The minimum lethal concentration.
2. The minimum exposure.
3. Concentration and exposure required to sterilize the eggs.
4. The effect of harborage.
5. The effect of warning gas (chloropicrin).
6. To correlate the results of these determinations for the purpose of developing a practical fumigation method that would be effective in clearing cockroaches from superstructure compartments.

LETHAL CONCENTRATION

Starting with 2.6 gm. per 1,000 cu. ft., the concentrations were increased by small amounts while using a constant exposure of 2 hours. Two things soon became quite evident: The first was that even quite small amounts of HCN killed some of the cockroaches; the second, that a small percentage of cockroaches were very much more resistant to the fumigant than were the majority. Four experiments are illustrative:

Experiment 1 (part 2.)—Concentration, 5.2 gm. per 1,000 cu. ft.; 6 cockroaches subjected to fumigant 2 hours; one killed.

Experiment 2.—Concentration, 7.8 gm.; exposure 2 hours; 3 of 7 cockroaches killed.

Experiment 17.—Concentration, 15 gm.; exposure 2 hours; 35 cockroaches killed; 3 recovered.

Experiment 27.—Concentration, 25 gm.; exposure 2 hours; 191 cockroaches killed; 4 recovered.

It will be noted that despite the fact that a concentration of 7.8 gm. killed 3 of 7 cockroaches and one of 15 gm. killed 35 of 38, a concentration of 25 gm. was insufficient to kill all of 195, 4 of which

recovered. This exceptional resistance of a few individuals appears throughout the experiments. It is quite probable that this characteristic is largely responsible for the difficulty of eradicating this insect.

The minimum lethal concentration for free running forms, exposure 2 hours, was found to be 30 gm. (approximately 1 oz.) per 1,000 cu. ft. This is seen when experiment 29 is compared with experiment 27, already cited.

Experiment 29.—Concentration 30 gm.; exposure 2 hours; all of 163 cockroaches killed.

It appears again when experiment 30 is compared with experiment 28:

Experiment 30.—Concentration 30 gm. HCN, plus 10 per cent (by volume) chloropicrin; exposure 2 hours; all of 143 cockroaches killed.

Experiment 28.—Concentration 30 gm. of mixture, HCN plus 10 per cent chloropicrin (by volume); actual concentration of HCN content less than 27 gm.; exposure 2 hours; 176 cockroaches killed; three recovered.

MINIMUM EXPOSURE

The minimum lethal exposure appears to be, roughly, inversely proportional to the concentrations used. This is seen in the experiments recorded in Table 1.

TABLE 1

Exposure No.	Concentration in grams	Length of exposure	Number of cockroaches exposed	Number killed	Exposure No.	Concentration in grams	Length of exposure	Number of cockroaches exposed	Number killed
29	30	2 hours	163	All.	42	120	30 minutes	98	All.
33	60	1 hour	149	148	52	180	15 minutes	99	97
35	60	45 minutes	67	66	64	240	10 minutes	168	All.

The importance of this factor lies in the apparent possibility of performing effective fumigations with short exposures by increasing the amounts of fumigant.

It will be seen that 240 gm. (8 oz.) per 1,000 cu. ft. is fatal to all exposed insects, free running forms, in a few minutes. It would be expected, therefore, that even in the presence of extensive harborage, such a concentration would be effective within the time available—usually 2 hours.

EGG RESISTANCE

The eggs proved more resistant than the free running forms. To render the eggs nonviable required about twice as much HCN, or twice the time of exposure.

The inverse relationship of concentration and exposure permits expressing lethal effects numerically. Thus, when concentration (C) is given in grams and exposure (E) in hours, the minimum lethal

effect for free running forms (M. L. E. F.) may be written: M. L. E. F. = CE = 60. For the eggs this becomes: M. L. E. E. = 2CE = 120. A concentration of 60 gm. was found to sterilize all exposed eggs in 2 hours; a concentration of 120 grams accomplished this result in 1 hour; while one of 240 grams required only one-half hour.

After fumigation, cockroaches with egg sacs were kept under observation for two weeks. It is possible that some eggs may have hatched at later periods. This occurred only once among approximately 200 egg sacs of several lots retained under observation for one month. This egg sac hatched after 16 days.

HARBORAGE

When furnished harborage, the cockroaches availed themselves of it to a marked degree. As a rule, less than 10 per cent of the cockroaches would be in view at any time during daylight hours. After fumigation they would be found scattered through the various layers of paper, cloth, and shavings.

The harborage provided was certainly not greater than that ordinarily available to cockroaches on shipboard and was decidedly less than that afforded on some ships.

In the presence of harborage, a concentration of 60 grams per 1,000 cu. ft. failed to sterilize all eggs in 2 hours. All were sterilized, however, with 120 grams. A concentration of 240 grams sterilized all eggs in 1 hour, but failed to destroy all eggs in one-half hour.

The following experiments are illustrative:

Experiment 55.—1,316 cockroaches, including 107 with egg sacs. Concentration 60 grams; exposure 2 hours; 10 cockroaches recovered, 8 egg sacs hatched.

Experiment 81.—658 cockroaches, including 51 with egg sacs. Concentration 120 grams; exposure 1 hour; 1 cockroach recovered; 3 egg sacs hatched.

Experiment 82.—535 cockroaches, including 47 with egg sacs. Concentration 120 grams; exposure 2 hours; no recoveries; no hatching.

Experiment 71.—633 cockroaches, including 70 with egg sacs. Concentration 240 grams; exposure 30 minutes; no recoveries; 3 egg sacs hatched.

Experiment 70.—545 cockroaches, including 90 with egg sacs. Concentration 240 grams; exposure one hour; no recoveries; no hatching.

It will be seen that M. L. E. E. H. (H = with harborage) = 4CE = 240. This figure, however, would necessarily vary with the amount, kind, and depth of the harborage.

COMMENT ON CONCENTRATION AND EXPOSURE

Minimum dosage and exposure as determined in the laboratory are premised upon one condition true in the laboratory but rarely obtained in practice. That condition is the maintenance of the concentration at a constant level throughout the period of exposure.

In the practice of fumigation two factors tend to produce a progressive reduction of the concentration: These are leakage and absorption.

One of the qualities that renders HCN so effective as a fumigant is its rapid diffusion and, hence, relatively deep penetration. The same quality causes rapid dissipation through even small openings. In the superstructure of a ship, dissipation may at times be so rapid as to reduce concentration to a level sublethal, even to rats, within one hour.

This rapid dissipation of the fumigant can be to a large extent overcome by carefully searching out all of the small openings and sealing them with paper and paste, or adhesive paper strips. The procedure is time-consuming (one would hardly believe the number of small cracks, crevices, and other openings that close search will uncover), but it will greatly improve effectiveness against insects. The longer the maximum concentration is maintained, the greater the penetration secured.

Numerous tests[3] have been made of the concentration actually occurring during fumigation in various ship compartments. In general these show that in the superstructure, when door cracks and other small openings are not pasted over, the concentration seldom attains more than one-half the calculated concentration. That is, when fumigant to the amount of 60 gm. (2 oz.) for every 1,000 cu. ft. of space has been actually introduced, the highest concentration found in air samples, withdrawn at intervals, is seldom greater than 30 gm. (1 oz.) per 1,000 cu. ft. The average concentration for the period of exposure will be less than this, and the terminal concentration is often quite low. When all cracks and small openings have been carefully closed with paper and paste, the concentration obtained approaches that calculated, though it seldom reaches it, but is maintained close to the high level. In a carefully sealed compartment one may expect, and will generally secure, when 60 gm. of fumigant per 1,000 cu. ft. have been used, a maximum actual concentration of not less than 45 gm. per 1,000 cu. ft., with an average during 2 hours of not less than 30 gm.

Besides dissipation through small openings, absorption is a material factor. This plays a relatively greater part in superstructure compartments, where porous material, such as bedding, cushions, carpets, and other fabrics take up the gas, than in the holds. It is presumably this factor that prevents attaining the calculated concentration even in the most carefully closed compartments.

Observation of results obtained on shipboard bear out those of concentrations, as a few experiments will illustrate:

Experiment 58.—Routine fumigation on shipboard: Forward superstructure fumigated with Zyklon, 60 gm. (2 oz.) HCN per 1,000 cu. ft. Exposure 2 hours. Cracks not sealed. After fumigation, 624 cockroaches gathered from pantry. Next morning at least 90 per cent of these were alive and lively.

[3] These will be discussed at length in another paper.

Experiment 60.—Experimental fumigation on shipboard: Forecastle fumigated with Zyklon, 150 gm. (5 oz.) HCN per 1,000 cu. ft. Cracks not sealed. Exposure 2 hours. After fumigation, 502 cockroaches gathered. Next morning 8 alive.

Experiment 72.—Routine fumigation on shipboard: Forward superstructure fumigated with Zyklon, 60 gm. (2 oz.) HCN per 1,000 cu. ft. Exposure 2 hours. Cracks not sealed. After fumigation, 5,000 (est.) cockroaches gathered. Next morning 2,000 (est.) had recovered. After 2 days, several hundred young hatched.

Experiment 73.—Experimental fumigation on shipboard: Cook's room, opening onto deck only through 1 door and 1 port, closed but not sealed. Fumigated with liquid HCN, 300 gm. (10 oz.) per 1,000 cu. ft. Exposure 2 hours. After fumigation, 650 cockroaches gathered from suitcases, drawers, clothing, and bedding; 2,000 (est.) cockroaches swept from the floor. Next morning 53 of those in harborage were alive and 64 of those from the floor had recovered.

Experiment 79.—Experimental fumigation: Forecastle fumigated with Zyklon, 300 gm. (10 oz.) HCN per 1,000 cu. ft. Exposure 2 hours. All cracks and openings sealed. After fumigation, 1,276 cockroaches gathered from floor, cracks in walls, and bedding. No recoveries; no hatching.

PRACTICAL APPLICATION

Restating our problem, we have as our object the eradication of cockroaches in living compartments on ships fumigated for the destruction of rats. Affecting this problem we find the following conflicting factors:

1. For rat destruction 60 gm. (2 oz.) HCN per 1,000 cu. ft. for 2 hours is the dosage and exposure used.

2. In the laboratory we find that this dose and exposure kills cock roaches, including eggs, only if maintained at full concentration throughout exposure and in the absence of harborage.

3. In the laboratory 120 gm. (4 oz.) HCN per 1,000 cu. ft., exposure 2 hours, is required to kill all forms in the presence of harborage.

4. Concentration tests on shipboard show that in practical fumigation the actual average concentration can not be counted upon as exceeding one-half that calculated.

5. Therefore, a theŏretical working formula would be as follows: Fumigation with 240 gm. (8 oz.) HCN per 1,000 cu. ft.; exposure, 2 hours. This is four times the amount used for rats. To give a reasonable margin, at least 300 gm. (10 oz.) HCN per 1,000 cu. ft., should be used.

6. Fumigation of an entire ship with 240 or 300 gm. per 1,000 cu. ft. would increase the cost of materials from approximately $40 per ship to $160 or $200 per ship, an apparently unjustifiable expense to the Government.

7. On some ships the holds are heavily infested with cockroaches. Eradication of those in the superstructure alone would be futile in such cases.

8. Dissipation of the fumigant is often very rapid in superstructure compartments, unless all small openings are sought out and sealed.

9. Cockroach infestation is often largely confined to the galley, pantry, storeroom, and forecastle.

10. The cubic capacity of superstructure compartments is relatively small, and so the increased cost of material necessary to kill cockroaches therein would average approximately $10 per ship.

11. Ship owners and operating personnel generally judge the effectiveness of fumigation on the basis of cockroach destruction, giving little consideration to its specific quarantine purpose to kill rats, and usually are quite unaware that much stronger concentrations are required to kill cockroaches.

12. The additional expenditure of $10 per ship is probably justified when this will secure practical eradication of cockroaches, thereby promoting cleanliness, inspiring respect for the effectiveness of the fumigation, and obviating criticism.

An endeavor to harmonize these factors is being made at the New York quarantine station as embodied in the following instructions contained in an order to the fumigation division, dated March 3, 1930:

> Officers in charge of fumigations are directed to pay particular attention to cockroaches in the superstructure. In making their inspections they should look for cockroaches in cupboards, drawers, under permanent benches, under tables, in cracks in the walls, and other locations where they are likely to hide.
>
> All lockers, cupboards, drawers, settees, and other small inclosed spaces must be opened and articles in the compartment so arranged as to permit free penetration.
>
> Compartments in the superstructure found infested with cockroaches shall be fumigated with 10 oz. (300 gm.) HCN per 1,000 cu. ft., and these compartments shall be tightly closed during such fumigation. All cracks and small openings shall be sealed by pasting over them strips of paper.
>
> Following fumigation bed clothing and other material likely to absorb dangerous amounts of the fumigant shall be taken into the open air. The officer in charge should assure himself that this is done before leaving the ship.
>
> In all cases where it is not possible or practicable to comply with these instructions or in which heavy cockroach infestation in the holds renders fumigation of cockroaches in the superstructure useless, the officer should make a note of the circumstances on his report.

CLEARING

It has been noted that clearing, even in the superstructure, was considerably prolonged when a concentration of 300 gm. (10 oz.) per 1,000 cu. ft. was employed. Occasionally storerooms ventilated only through a small hatch in the floor of the pantry are encountered. Heavy doses in these will require artificial ventilation, unless overnight airing can be had with safety. Since, with only 60 gm. (2 oz.) per 1,000 cu. ft., it has been noted that bedding may absorb a dangerous quantity of the fumigant, it must be obvious that greater amounts may be absorbed when the dosage is increased.

INFLUENCE OF WARNING GAS

For the purpose of giving warning of its presence, it is customary to mix a lachrimatory gas with HCN. The gas generally used in the United States is chloropicrin, in the amount of 5 per cent or 10 per cent (by weight) of the HCN present.

There was reason to suspect that the presence of this warning gas might interfere with the lethal action of HCN on insects. Insects breath through spiracles in the thorax and abdomen, which probably are contractile and capable of closure. It is known that insects apparently dead from asphyxiation may recover after considerable intervals of time. On these premises the theory has been advanced that the irritant warning gas may cause the spiracles to close, resulting in the partial asphyxiation of the insect without, however, its poisoning by the HCN, so that upon the return of fresh air it recovers.

This theory was experimentally tested in the laboratory by first determining the minimum lethal concentration of HCN, without warning gas, and then subjecting cockroaches to greater concentrations containing 5 per cent or 10 per cent chloropicrin.

It may be briefly stated that the chloropicrin exerted no influence that could be noted. In all experiments the death or recovery of the cockroaches resulted only as the HCN content was up to or below the lethal concentration. This appeared most clearly in several experiments wherein HCN with chloropicrin, in concentrations near the lethal point, was used. When the concentration was 30 gm. *of the mixture* per 1,000 cu. ft., some cockroaches recovered; but when the dosage of the mixture was increased so that *the HCN content* reached a concentration of 30 gm. per 1,000 cu. ft., none of the cockroaches recovered.

One experiment was performed with chloropicrin alone. In this experiment 22 cockroaches were subjected to a concentration of 150 gm. chloropicrin per 1,000 cu. ft. for 40 minutes. For a few minutes they were very active indeed, but at the end of 10 minutes they had become sluggish in their movements. At the end of 40 minutes they were still moving their legs, though most of them were on their backs. After airing overnight, 9 were alive and 13 dead. Chloropicrin is sometimes used as an insecticide, but relatively long exposures are recommended by the manufacturers.

TABULATION OF EXPERIMENTS

For the information of those who may desire to study the experimental determinations in more detail, all pertinent experiments are listed in Table 2.

TABLE 2.—*A tabulation of all experiments. Fumigant is liquid HCN unless otherwise stated*

PART 1. LABORATORY EXPERIMENTS

Experiment number	Concentration in gm. per 1,000 cu. ft.	Exposure in hours	Total number of cockroaches	Cockroaches killed	Cockroaches recovering	Cockroaches with egg sacs	Egg sacs hatched	Number of young hatched	Remarks
1	5.2	2	6	1	5	--------	--------	--------	Concentration started at 2.6 gm. increased to 5.2 at end of first 10 minutes.
2	7.8	2	7	4	3	--------	--------	--------	
5	12	2	15	4	11	--------	--------	--------	One fell over in 2 minutes; all were down and quiet in 13 minutes.
8	25	2	22	22	0	(?)	1	20	
9	35	2	24	24	0	1	0	--------	All were down and movement stopped in 3 minutes.
11	35	1	48	48	0	--------	--------	--------	After 14 hours, 6 were moving legs, but all were dead 24 hours later.
13	35	⅙	14	4	10	--------	--------	--------	
14	15	2	20	26	0	--------	--------	--------	
15	15	2	32	32	0	(?)	2	(?)	
16	15	2	41	39	2	4	0	0	Fumigant, liq. HCN containing 5 per cent (by vol.) chloropicrin; concentration of mixture 15 gm. per 1,000 cu. ft.; 4 alive after 14 hours, but 2 of these were dead 24 hours later.
17	15	2	38	35	3	8	2	(?)	
18	15	2	22	21	1	6	2	(?)	Fumigant same as in Exp. No. 16; concentration 15 gm. of mixture; 3 alive after 14 hours, but 2 of these dead 24 hours later.
19	15	2	30	30	0	5	0	0	
20	20	2	37	35	2	(?)	2	(?)	Fumigant same as in Exp. No. 16; concentration 15 gm. of mixture; 4 alive after 14 hours, but 2 of these dead 24 hours later.
21	20	2	32	30	2	(?)	1	(?)	
22	25	2	32	32	0	4	2	(?)	Fumigant same as in Exp. No. 16; concentration 25 gm. of mixture.
23	25	2	47	47	0	6	0	0	
24	25	2	46	46	0	4	0	0	Do.
25	25	2	44	44	0	6	0	0	
26	25	2	220	197	23	64	12	179	Do.
27	25	2	195	191	4	62	19	291	
28	30	2	179	176	3	59	16	220	Fumigant, liquid HCN containing 10 per cent (by vol.) chloropicrin; concentration 30 gm. of mixture.
29	30	2	163	163	0	76	3	41	
30	30	2	143	143	0	44	4	55	Fumigant same as in Exp. No. 28; concentration 30 gm. of HCN content. 3 were moving legs after 14 hours, but dead 24 hours later.
31	30	2	134	134	0	44	1	36	Fumigant liquid HCN containing 5 per cent (by weight) chloropicrin; concentration 30 gm. of mixture; 2 alive after 14 hours, but 1 died 24 hours later and 1 died 48 hours later.
32	30	2	57	50	7	13	0	0	Fumigant, frozen HCN. Evaporation required 20 minutes.
33	60	1	149	148	1	37	3	59	
34	30	2	77	77	0	25	2	54	Fumigant, liquid HCN frozen for 2 days and melted shortly before use.
35	60	¾	67	66	1	25	3	54	

TABLE 2.—*A tabulation of all experiments. Fumigant is liquid HCN unless otherwise stated*—Continued

PART 1. LABORATORY EXPERIMENTS—Continued

Experiment number	Concentration in gm per 1,000 cu. ft.	Exposure in hours	Total number of cockroaches	Cockroaches killed	Cockroaches recovering	Cockroaches with egg sacs	Egg sacs hatched	Number of young hatched	Remarks
36	60	½	108	99	11	38	(?)	61	Egg sacs observed for 1 day only.
37	60	¼	114	(?)	(?)	29	--------	--------	The majority had recovered after 3 hours.
38	60	1	125	125	0	26	9	138	Fumigant liquid HCN containing 5 per cent (by weight) chloropicrin; concentration 60 grams of mixture.
39	60	¾	129	128	1	23	(?)	(?)	Fumigant and concentration same as in experiment No. 38 About 250 young hatched in 5 days.
40	60	¾	131	129	2	36	2	42	Fumigant liquid HCN containing 10 per cent (by volume) chloropicrin; concentration 60 grams of mixture, 3 alive after 14 hours but 1 died 24 hours later. (Comparison of 39 and 40 suggests that chloropicrin kills eggs.)
41	60	2	105	105	0	27	0	0	
42	120	½	98	98	0	14	1	12	
43	120	¼	86	86	0	12	0	0	
45	60	2	142	142	0	45	0	0	
46	60	1½	120	120	0	35	0	0	
47	120	⅙	47	37	10	17	--------	--------	Observed only 1 day.
48	120	1/12	48	8	40	15	--------	--------	Do.
49	120	1	100	100	0	30	0	0	
50	120	¾	82	82	0	23	0	0	
51	180	½	157	157	0	32	2	33	
52	180	¼	99	98	1	17	5	67	
53	60	2	1,625	1,574	51	83	14	(?)	Harborage as described in text. Paper wet from spilled water. Eggs observed 2 days only.
54	120	½	121	121	0	23	3	54	25 young died shortly after hatching.
55	60	2	1,316	1,306	10	107	8	158	Harborage, dry.
59	240	½	624	624	0	42	--------	--------	Recovered cockroaches from experiment No. 58.
62	240	⅓	199	199	0	53	0	0	
63	240	¼	283	283	0	88	0	0	
64	240	⅙	168	168	0	56	0	0	
65	120	1	193	193	0	58	0	0	
66	120	¾	177	177	0	44	0	0	
67	180	¾	210	210	0	49	0	0	
69	240	2	481	481	0	70	0	0	Harborage.
70	240	1	545	545	0	90	0	0	Do.
71	240	½	633	633	0	70	3	60	Do.
75	30	2	308	308	0	42	1	22	Fumigant, Zyklon-B.
76	60	1	381	381	0	44	0	0	Do.
77	240	½	232	232	0	32	0	0	Do.
78	20	2	313	306	7	46	2	40	Fumigant, Zyklon-B, 9 alive at end of 14 hours, but 2 died during next 24 hours.
81	120	1	658	657	1	51	2	47	Harborage.
82	120	2	535	535	0	47	1	16	Do.

PART 2 (TABLE 2). EXPERIMENTS ON SHIPS

Experiment No. 56.—Officers' quarters fumigated with Zyklon, 60 gm. (2 oz.) per 1,000 cu. ft.; exposure 2 hours; openings not sealed. Samples from five locations taken at 25-minute intervals showed concentrations varying from 15 gm. to 60 gm. per 1,000 cu. ft.; average 20, 40, 45, 35, and 25 at each interval. From shelves and cracks 113 cockroaches were gathered. Next day 43 were alive.

Experiment No. 58.—Officers' quarters fumigated with Zyklon, 60 gm. (2 oz.) per 1,000 cu. ft.; exposure 1¼ hours; openings not sealed. From floor, shelves, and cracks 624 cockroaches were gathered. Next day at least 90 per cent of these were alive.

Experiment No. 60.—Forecastle (crews' quarters) fumigated with Zyklon, 150 gm. (5 oz.) per 1,000 cu. ft.; exposure 2½ hours; openings not sealed, but doors tight fitting. From floor and one locker 502 cockroaches were gathered. Next day 8 were alive. No hatching.

Experiment No. 61.—Forecastle (crews' quarters) fumigated with Zyklon, 4 oz. per 1,000 cu. ft.; exposure 2 hours; openings not closed. From the floor approximately 2,000 cockroaches were gathered. Next day 26 were alive. One of 200 egg sacs hatched.

Experiment No. 72.—Fumigation of superstructure with Zyklon, 60 gm. (2 oz.) per 1,000 cu. ft.; exposure 2 hours; openings not sealed. From various locations 5,000+ (estimated) cockroaches were gathered. Next day 40 per cent or more (2,000 estimated) were alive. The following day several hundred young hatched.

Experiment No. 73.—Cooks' room—isolated, with one door and one port only openings—closed tightly, but not sealed. Fumigated with liquid HCN, 300 gm. (10 oz.) per 1,000 cu. ft.; exposure 2 hours. From protected locations such as suitcases (open but full of clothes), drawers, clothing, and bedding were gathered 650 cockroaches, and from the floor 2,000+ (estimated) cockroaches. Next morning 53 of the 650 from harborage were alive and 64 of the 2,000+ from the floor had recovered.

Experiment No. 74.—Fumigation of holds, loaded with cocoa beans in sacks. Fumigated with Zyklon, 60 gm. (2 oz.) per 1,000 cu. ft.; exposure 4 hours. One week later great numbers (certainly more than 100,000) of cockroaches, both *Blattela germanica* and *Blatta orientalis*, were seen in the holds. Many of these were dead, but the majority were alive.

Experiment No. 79.—Forecastle (crews' quarters) fumigated with Zyklon, 300 gm. (10 oz.) per 1,000 cu. ft.; exposure 2 hours. All openings sealed. After fumigation, 1,276 cockroaches were gathered from floor, cracks, and bedding. No recoveries; no hatching.

Experiment No. 80.—Pantry fumigated with liquid HCN, 300 gm. (10 oz.) per 1,000 cu. ft.; exposure 2 hours. Openings not sealed. After fumigation 1,000+ (estimated) cockroaches gathered from floor. Next day 9 were alive but sluggish. Only 2 fully recovered.

Experiment No. 84.—Mess room fumigated with HCN discoids, 300 gm. (10 oz.) per 1,000 cu. ft.; exposure 2 hours. Openings not sealed. Hallways on either side into which doors opened fumigated with 60 gm. (2 oz.) per 1,000 cu. ft. After fumigation 273 cockroaches were gathered from shelves and drawers. Next day 18 were alive, but only 5 of these survived beyond the third day.

Experiment No. 85.—Galley fumigated with Zyklon, 900 gm. (30 oz.) per 1,000 cu. ft.; exposure 1 hour. Closure poor due to poorly fitting skylights and doors. Stove still hot. Openings not sealed. After fumigation 600+ (estimated) cockroaches gathered from floor and table. Next day 4 alive.

Experiment No. 86.—Forecastle (crews' quarters) fumigated with Zyklon, 450 gm. (15 oz.) per 1,000 cu. ft.; exposure 2 hours. Openings not sealed. After fumigation 1,000+ (estimated) cockroaches gathered. No recoveries; no hatching.

Experiment No. 87.—Mess room fumigated with HCN discoids, 300 gm. (10 oz.) per 1,000 cu. ft.; exposure 2 hours. All openings sealed. After fumigation 2,000+ (estimated) cockroaches gathered from floor and table. Next day 6 were alive. About 30 minutes after opening this mess room 3 live cockroaches were seen to emerge from behind a large mirror, 3 feet by 3½ feet, which was screwed to one wall. Since 200 or more of the cockroaches gathered were on the table under this mirror it is presumed that the six recovering probably emerged from this harborage late in the fumigation.

Experiment No. 88.—Crews' quarters in the stern fumigated with liquid HCN, 300 gm. (10 oz.) per 1,000 cu. ft.; exposure 2 hours. All openings sealed.

After fumigation 500+ (estimated) cockroaches gathered from various rooms. No recoveries, no hatching. Next day the crew tapped over the surface of a sheathing covering a bulkhead. This sheathing was incomplete at the bottom. From behind it dropped many thousands of dead cockroaches. No live ones were seen.

COURT DECISION RELATING TO PUBLIC HEALTH

Death from cerebrospinal meningitis held compensable under Federal longshoremen's and harbor workers' compensation act.—(United States District Court, W. D. Washington, N. D.; Todd Dry Docks, Inc., et al. (Pittson, Intervener) *v.* Marshal, Deputy Com'r, 49 F. (2d) 621; decided Jan. 15, 1931.) The Federal longshoremen's and harbor workers' compensation act provided:

> The term "injury" means accidental injury or death arising out of and in the course of employment, and such occupational disease or infection as arises naturally out of such employment or as naturally or unavoidably results from such accidental injury.

A steamship arrived at Seattle from the Orient, having on board a number of Filipino steerage passengers suffering from cerebrospinal meningitis. After the arrival of the ship, a pipe fitter, in connection with his duties, worked on board the vessel for several days. A week after being so employed he died of cerebrospinal meningitis. The district court held that the deceased employee died from an infectious disease that arose naturally out of his employment and approved an award which had been made under the compensation act.

The court also stated that it appeared under the findings and evidence that the award was within the "accidental injury" phase as well. Concerning this, the court said:

> No doubt, if the body of the deceased had been penetrated by shots from the accidental discharge of a shotgun on the steerage, from the effects of which he lingered and died of blood poisoning, an award would be sustained. By the same token, the discharge of infectious germs by coughing or sneezing on the steerage, some of which penetrated the mucous membrane of the employee, resulting in his speedy death, resulted in accidental injury. In the one the shot penetrated the muscles of the body, and in the other the germ penetrated the mucous membrane.

DEATHS DURING WEEK ENDED JUNE 27, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended June 27, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended June 27, 1931	Corresponding week, 1930
Policies in force	75, 148, 752	75, 988, 917
Number of death claims	13, 184	12, 937
Death claims per 1,000 policies in force, annual rate	9. 1	8. 9

Deaths [1] from all causes in certain large cities of the United States during the week ended June 27, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended June 27, 1931				Corresponding week, 1930		Death rate [2] for the first 26 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,669	11.2	632	[4] 48	11.3	691	13.0	12.8
Akron	41	8.3	2	20	4.7	1	8.2	8.3
Albany [5]	28	11.3	3	59	12.2	7	15.0	15.8
Atlanta	65	12.2	7	72	22.3	22	15.8	16.9
White	31	--------	5	79	--------	6	--------	--------
Colored	34	(6)	2	57	(6)	16	(6)	(6)
Baltimore [5]	215	13.8	18	61	13.1	17	15.7	14.9
White	172	--------	12	52	--------	11	--------	--------
Colored	43	(6)	6	94	(6)	6	(6)	(6)
Birmingham	62	12.0	5	50	17.3	12	14.6	14.3
White	26	--------	4	69	--------	5	--------	--------
Colored	36	(6)	1	24	(6)	7	(6)	(6)
Boston	198	13.1	17	49	10.7	14	15.4	15.5
Bridgeport	31	11.0	2	33	7.8	2	12.1	12.3
Buffalo	143	12.8	15	61	12.2	7	14.2	14.0
Cambridge	33	15.1	4	80	14.2	3	13.5	13.4
Camden	27	11.8	4	70	13.2	5	15.7	14.7
Canton	15	7.3	5	114	8.9	0	11.1	10.9
Chicago [5]	681	10.3	63	56	9.2	35	11.3	11.2
Cincinnati	147	16.8	4	24	14.4	9	16.8	16.4
Cleveland	190	12.9	12	35	10.7	13	12.0	12.1
Columbus	71	12.5	3	29	12.5	6	14.7	17.3
Dallas	67	12.8	12	--------	11.7	5	12.1	12.1
White	40	--------	7	--------	--------	4	--------	--------
Colored	27	(6)	5	--------	(6)	1	(6)	(6)
Dayton	49	12.4	1	14	10.1	3	12.9	10.5
Denver	73	13.0	7	68	13.9	4	14.9	15.0
Des Moines	53	19.1	3	53	10.9	1	11.9	12.5
Detroit	270	8.5	22	35	8.6	38	9.1	10.2
Duluth	22	11.3	0	0	8.7	1	11.3	11.7
El Paso	37	18.4	5	--------	24.3	19	17.4	18.7
Erie	23	10.2	1	19	14.8	2	11.4	11.5
Fall River [5] [7]	13	5.9	1	23	8.6	4	12.9	13.3
Flint	10	3.2	1	13	8.9	6	7.8	10.0
Fort Worth	33	10.3	1	--------	8.9	3	11.7	11.6
White	27	--------	1	--------	--------	3	--------	--------
Colored	6	(6)	0	--------	(6)	0	(6)	(6)
Grand Rapids	37	11.2	0	0	10.8	4	9.8	11.4
Houston	63	10.6	11	--------	13.6	3	11.6	12.8
White	49	--------	10	--------	--------	2	--------	--------
Colored	14	(6)	1	--------	(6)	1	(6)	(6)
Indianapolis	99	14.0	6	49	15.0	6	14.5	15.3
White	88	--------	4	38	--------	6	--------	--------
Colored	11	(6)	2	134	(6)	0	(6)	(6)
Jersey City	73	11.9	12	107	10.2	4	12.7	12.4
Kansas City, Kans	29	12.3	2	41	9.4	2	14.1	11.6
White	19	--------	0	0	--------	2	--------	--------
Colored	10	(6)	2	254	(6)	0	(6)	(6)
Kansas City, Mo	97	12.4	6	46	12.3	7	14.2	13.7
Knoxville	16	7.6	0	0	11.3	5	13.5	14.6
White	12	--------	0	0	--------	2	--------	--------
Colored	4	(6)	0	0	(6)	3	(6)	(6)
Long Beach	27	9.2	0	0	7.2	3	10.4	10.0
Los Angeles	273	10.8	22	64	10.1	20	11.3	11.6
Louisville	68	11.5	1	9	11.7	5	15.4	14.1
White	51	--------	1	10	--------	4	--------	--------
Colored	17	(6)	0	0	(6)	1	(6)	(6)
Lowell [7]	32	16.6	5	127	12.4	3	13.7	14.7
Lynn	9	4.6	1	26	9.7	0	10.9	11.8
Memphis	79	15.9	9	95	20.5	15	17.2	18.0
White	41	--------	6	100	--------	7	--------	--------
Colored	38	(6)	3	87	(6)	8	(6)	(6)
Miami	17	7.9	3	76	11.3	2	12.9	12.1
White	9	--------	0	0	--------	2	--------	--------
Colored	8	(6)	3	265	(6)	6	(6)	(6)

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended June 27, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended June 27, 1931				Corresponding week, 1930		Death rate [2] for the first 26 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	99	8.8	19	82	9.9	11	10.0	10.4
Minneapolis	97	10.7	7	45	9.8	5	11.8	11.1
Nashville	51	17.1	3	45	20.0	7	17.3	16.7
White	26	------	2	40	------	2	------	------
Colored	25	(6)	1	59	(6)	5	(6)	(6)
New Bedford [7]	30	13.9	2	53	9.3	2	13.3	12.2
New Haven	39	12.5	1	19	11.5	1	12.7	14.4
New Orleans	126	14.1	11	60	21.5	20	17.8	18.8
White	77	------	7	58	------	8	------	------
Colored	49	(6)	4	65	(6)	12	(6)	(6)
New York	1,416	10.4	104	43	10.3	136	12.3	11.8
Bronx Borough	223	8.7	15	34	7.8	15	9.0	8.5
Brooklyn Borough	494	9.8	39	41	9.1	33	11.4	10.9
Manhattan Borough	523	15.0	41	70	15.8	65	18.9	17.7
Queens Borough	134	6.1	7	19	6.2	16	7.9	7.6
Richmond Borough	37	11.8	2	36	14.7	7	14.2	15.0
Newark, N. J.	87	10.2	9	47	12.8	7	12.7	13.4
Oakland	57	10.2	4	51	8.4	1	11.2	11.5
Oklahoma City	42	11.1	7	97	9.7	8	11.9	10.5
Omaha	44	10.6	4	45	13.9	2	14.5	13.8
Paterson	33	12.4	1	17	12.0	3	14.6	13.3
Peoria	28	13.5	2	53	13.8	0	13.0	13.1
Philadelphia	402	10.7	28	41	10.5	35	14.6	13.4
Pittsburgh	156	12.0	16	55	12.6	23	16.2	15.0
Portland, Oreg	57	9.7	2	24	11.2	2	12.3	13.0
Providence	63	12.9	8	74	11.7	5	14.1	14.5
Richmond	41	11.6	6	87	16.2	8	16.6	15.9
White	19	------	2	44	------	2	------	------
Colored	22	(6)	4	174	(6)	6	(6)	(6)
Rochester	68	10.7	5	46	10.0	6	12.9	12.4
St. Louis	294	18.5	27	91	10.7	15	16.5	14.7
St. Paul	52	9.8	4	41	11.1	6	11.3	11.0
Salt Lake City [5]	24	8.8	1	15	12.6	2	12.8	13.6
San Antonio	55	11.9	13	------	16.5	8	16.1	18.6
San Diego	35	11.7	2	41	13.9	2	14.7	14.8
San Francisco	135	10.8	2	13	10.0	3	13.7	13.4
Schenectady	21	11.4	1	29	9.8	1	10.9	12.1
Seattle	59	8.3	2	19	8.1	3	12.2	11.4
Somerville	21	10.4	0	0	6.0	0	10.4	10.9
South Bend	14	6.8	2	50	9.4	0	8.8	9.5
Spokane	25	11.2	1	26	12.6	1	12.8	13.2
Springfield, Mass	26	8.9	5	77	10.1	3	13.1	13.4
Syracuse	52	12.7	3	36	9.2	2	12.5	12.9
Tacoma	25	12.1	3	77	13.6	5	13.2	13.0
Toledo	63	11.1	7	64	9.8	8	12.8	13.5
Trenton	35	14.7	4	70	16.9	1	18.2	17.7
Utica	25	12.7	2	52	12.8	1	15.3	16.3
Washington, D. C	127	13.4	10	55	13.8	11	16.9	15.9
White	85	------	7	57	------	4	------	------
Colored	42	(6)	3	52	(6)	7	(6)	(6)
Waterbury	14	7.2	1	30	13.5	7	10.3	10.6
Wilmington, Del. [7]	29	14.2	1	22	11.7	2	15.4	15.4
Worcester	37	9.8	3	41	10.7	3	13.7	14.1
Yonkers	23	8.6	1	26	10.8	2	9.5	8.7
Youngstown	26	7.8	2	28	9.2	5	10.9	10.7

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended July 4, 1931, and July 5, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 4, 1931, and July 5, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930
New England States:								
Maine	2	1			25	17	0	0
New Hampshire					36	2	0	0
Vermont	1	2			43	9	0	0
Massachusetts	39	31	1		300	409	0	0
Rhode Island	11	2			99	17	0	0
Connecticut	10	5	1		131	20	2	1
Middle Atlantic States:								
New York	113	89	[1] 6	[1] 6	1,108	824	4	7
New Jersey	33	38	2	4	334	502	6	2
Pennsylvania	52	103			1,018	791	4	4
East North Central States:								
Ohio	15	20	1	8	390	205	2	1
Indiana	6	7	1		129	60	4	3
Illinois	80	98	9	16	753	222	9	3
Michigan	35	44	1		237	316	3	10
Wisconsin	13	12	11	1	499	308	1	1
West North Central States:								
Minnesota	4	4	1		58	72	1	0
Iowa	1	4			7	14	0	1
Missouri	13	21			27	38	2	3
North Dakota	2				8	2	1	0
South Dakota	8	4	1		3	19	0	0
Nebraska	1	5				47	0	3
Kansas	5	11			28	103	2	1
South Atlantic States:								
Delaware	1				35	11	0	0
Maryland [2] [3]	6	7	1	2	180	19	1	1
District of Columbia	3	6			18	43	0	1
Virginia [2]								
West Virginia	5	10		6	163	82	2	4
North Carolina [2]	7	6		9	203	40	1	1
South Carolina	9	9	86	69	63		0	1
Georgia [2]	2			4	33	29	2	0
Florida	6	2			12	14	1	0

[1] New York City only.
[2] Typhus fever: 1931, 15 cases; 2 cases in Maryland; 1 case in Virginia; 1 case in North Carolina; 5 cases in Georgia; 3 cases in Alabama; and 3 cases in Texas. Report of 3 cases of typhus fever in Mississippi during the week ending June 20, 1931, was erroneous.
[3] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 4, 1931, and July 5, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930
East South Central States:								
Kentucky					36	3	0	0
Tennessee	1	1	1	2	26	24	2	7
Alabama [2]	7	3	2	2	19	21	3	1
Mississippi [3]	7	4					0	4
West South Central States:								
Arkansas		5		3	7	8	0	0
Louisiana	18	12	20	3		7	1	2
Oklahoma [4]	5	4	17	2	3	41	0	2
Texas [2]	16	21	3	7	28	51	1	0
Mountain States:								
Montana		2			3	5	0	0
Idaho						4	1	0
Wyoming					7	12	0	0
Colorado	3	3			169	160	0	0
New Mexico	4	5			10	19	0	0
Arizona	2		1		8	34	0	2
Utah [3]	2		3		10	23	0	2
Pacific States:								
Washington	11	1			46	173	0	0
Oregon	2	3	9	3	13	53	0	0
California	53	46	16	22	269	665	0	2

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930
New England States:								
Maine	2	0	30	6	0	0	4	0
New Hampshire	0	1	2	0	0	0	0	0
Vermont	1	0	2	8	21	0	0	0
Massachusetts	5	2	136	60	0	0	7	0
Rhode Island	0	0	16	4	0	0	0	0
Connecticut	2	0	22	16	0	0	1	1
Middle Atlantic States:								
New York	5	1	252	91	30	27	13	16
New Jersey	0	0	91	49	1	0	0	4
Pennsylvania	1	1	254	197	1	0	19	15
East North Central States:								
Ohio	5	4	134	88	45	72	24	10
Indiana	0	11	47	38	72	101	6	3
Illinois	4	5	131	126	27	63	14	8
Michigan	2	0	240	65	13	42	6	4
Wisconsin	2	0	46	43	19	10	0	2
West North Central States:								
Minnesota	0	10	24	27	3	0	2	3
Iowa	0	0	12	8	38	73	4	3
Missouri	1	1	21	33	6	19	16	9
North Dakota	0	0	6	1	9	10	0	0
South Dakota	0	0	2	6	3	14	4	1
Nebraska	0	0	5	24	7	39	5	0
Kansas	2	0	6	24	20	72	6	6
South Atlantic States:								
Delaware	0	0	9	0	0	0	0	0
Maryland [2] [3]	0	0	23	26	0	0	6	8
District of Columbia	0	0	6	4	0	0	0	0
Virginia [2]								
West Virginia	0	1	13	15	3	2	10	8
North Carolina [2]	2	3	14	15	1	8	31	29
South Carolina	0	4	0	5	0	1	68	82
Georgia [2]	1	0	11	1	4	0	38	7
Florida	0	0	3	0	0	0	1	42

[2] Typhus fever: 1931, 15 cases; 2 cases in Maryland; 1 case in Virginia; 1 case in North Carolina; 5 cases in Georgia; 3 cases in Alabama; and 3 cases in Texas. Report of 3 cases of typhus fever in Mississippi during the week ended June 20, 1931, was erroneous.

[3] Week ended Friday.

[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 4, 1931, and July 5, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930	Week ended July 4, 1931	Week ended July 5, 1930
East South Central States:								
Kentucky	0	0	27	8	8	0	6	6
Tennessee	0	2	1	7	8	4	14	52
Alabama [2]	0	0	10	16	9	0	26	31
Mississippi	0	0	1	2	15	1	15	38
West South Central States:								
Arkansas	1	0	3	2	14	2	22	20
Louisiana	1	20	6	15	25	2	25	29
Oklahoma [4]	0	11	5	12	24	68	23	27
Texas [2]	2	4	14	18	70	77	24	22
Mountain States:								
Montana	0	0	4	5	1	6	2	1
Idaho	0	0	0	1	3	3	0	0
Wyoming	1	0	7	2	2	0	0	1
Colorado	0	1	20	11	11	7	10	2
New Mexico	0	1	2	2	1	2	4	5
Arizona	0	0	1	2	0	3	1	17
Utah [3]	0	0	1	5	4	0	1	1
Pacific States:								
Washington	0	2	12	11	11	30	1	1
Oregon	0	0	7	4	25	8	4	8
California	5	88	45	38	8	17	9	10

[2] Typus fever: 1931, 15 cases; 2 cases in Maryland; 1 case in Virginia; 1 case in North Carolina; 5 cases in Georgia; 3 cases in Alabama; and 3 cases in Texas. Report of 3 cases of typhus fever in Mississippi during the week ended June 20, 1931, was erroneous.
[3] Week ended Friday.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May, 1931										
California	17	304	183	1	4,780	11	10	554	93	44
Georgia	8	31	336	161	823	106	0	276	44	48
Kansas	2	46	13	--------	497	2	0	170	284	10
Mississippi	5	33	1,024	2,495	260	2,144	3	78	184	45
South Carolina	--------	82	1,879	1,264	674	788	2	28	6	47
June, 1931										
Arizona	7	8	4	1	148	--------	0	5	4	20
Connecticut	2	15	7	--------	1,211	--------	2	122	0	8
District of Columbia	2	38	1	--------	313	1	1	57	0	--------
Georgia	--------	18	67	164	270	82	3	102	0	93
Maine	1	14	2	--------	115	--------	0	92	0	11
Nebraska	3	25	2	--------	17	--------	0	83	80	--------

May, 1931	Cases
Actinomycosis:	
California	1
Botulism:	
California	3
Chicken pox:	
California	1,710
Georgia	179
Kansas	335
Mississippi	694
South Carolina	392
Conjunctivitis:	
Georgia	2
Dengue:	
Mississippi	10
Diarrhea:	
South Carolina	1,427
Dysentery:	
California (amebic)	9
California (bacillary)	8
Georgia	54
Mississippi (amebic)	30

Food poisoning:	Cases
California	58
German measles:	
California	44
Kansas	5
South Carolina	118
Granuloma, coccidioidal:	
California	2
Hookworm disease:	
Georgia	50
Mississippi	204
South Carolina	101
Leprosy:	
California	2
Georgia	1
Lethargic encephalitis:	
California	6
South Carolina	4
Mumps:	
California	1,145
Georgia	175
Kansas	557
Mississippi	331
South Carolina	152
Ophthalmia neonatorum:	
California	2
Mississippi	5
South Carolina	16
Paratyphoid fever:	
California	1
Puerperal septicemia:	
Mississippi	26
Rabies in animals:	
California	104
Mississippi	5
South Carolina	10
Rabies in man:	
California	2
South Carolina	2
Scabies:	
Kansas	3
Septic sore throat:	
California	12
Georgia	42
Kansas	4
Tetanus:	
California	3
Georgia	1
Kansas	1
South Carolina	2
Trachoma:	
California	14
Mississippi	5
Trichinosis:	
California	1
Tularaemia:	
Georgia	1
Kansas	2
Typhus fever:	
Georgia	52
Undulant fever:	
California	7
Kansas	2
South Carolina	1
Vincent's angina:	
Kansas	4

Whooping cough:	Cases
California	1,166
Georgia	172
Kansas	176
Mississippi	450
South Carolina	304

June, 1931

Chicken pox:	
Arizona	20
Connecticut	307
District of Columbia	78
Georgia	60
Maine	107
Nebraska	125
Conjunctivitis:	
Connecticut	9
Maine	1
Dysentery:	
Arizona	3
Connecticut (bacillary)	2
Georgia	93
German measles:	
Connecticut	25
Maine	5
Lethargic encephalitis:	
Connecticut	1
District of Columbia	1
Mumps:	
Arizona	5
Connecticut	222
Georgia	105
Maine	148
Nebraska	254
Ophthalmia neonatorum:	
Arizona	1
Paratyphoid fever:	
Connecticut	6
Georgia	3
Maine	1
Rabies in animals:	
Connecticut	4
Rocky Mountain spotted or tick fever:	
District of Columbia	3
Septic sore throat:	
Connecticut	5
Georgia	25
Tetanus:	
Connecticut	1
Trachoma:	
Arizona	1
Typhus fever:	
Connecticut	1
Georgia	5
Undulant fever:	
Arizona	3
Connecticut	1
Vincent's angina:	
Maine	11
Whooping cough:	
Arizona	23
Connecticut	245
District of Columbia	52
Georgia	94
Maine	54
Nebraska	51

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,-235,000. The estimated population of the 89 cities reporting deaths is more than 31,690,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended June 27, 1931, and June 28, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	677	784	----------
96 cities	347	411	633
Measles:			
45 States	9,910	8,266	----------
96 cities	3,648	3,054	----------
Meningococcus meningitis:			
46 States	75	95	----------
96 cities	38	35	----------
Poliomyelitis:			
46 States	40	120	----------
Scarlet fever:			
46 States	2,474	1,640	----------
96 cities	1,074	667	715
Smallpox:			
46 States	470	768	----------
96 cities	49	82	36
Typhoid fever:			
46 States	375	493	----------
96 cities	66	82	58
Deaths reported			
Influenza and pneumonia:			
89 cities	431	414	----------
Smallpox:			
89 cities	0	0	----------

City reports for week ended June 27, 1931

The "estimated expectancy" given for diphtheria poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascerta n from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidem c periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	9	0	1	----------	0	1	1	0
New Hampshire:								
Concord	0	0	0	----------	0	1	0	0
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Burlington	2	0	1	----------	0	0	0	0
Massachusetts:								
Boston	54	25	21	1	0	36	14	12
Fall River	1	2	3	----------	0	20	3	1
Springfield	10	2	2	----------	0	14	24	2
Worcester	9	2	0	----------	0	2	5	1
Rhode Island:								
Pawtucket	----------	0	----------	----------	----------	----------	----------	----------
Providence	0	4	0	----------	0	78	99	1
Connecticut:								
Bridgeport	10	4	0	1	1	5	3	2
Hartford	----------	3	----------	----------	----------	----------	----------	----------
New Haven	21	0	1	----------	0	24	3	2
MIDDLE ATLANTIC								
New York:								
Buffalo	16	8	5	----------	1	75	16	18
New York	213	203	73	5	1	623	69	107
Rochester	5	6	1	----------	0	142	8	3
Syracuse	15	1	0	----------	0	19	8	1
New Jersey:								
Camden	1	5	2	----------	0	0	2	3
Newark	47	11	7	----------	0	21	2	6
Trenton	0	2	0	1	0	18	6	1
Pennsylvania:								
Philadelphia	65	45	8	2	1	166	33	16
Pittsburgh	35	15	9	----------	2	75	81	13
Reading	6	2	0	----------	0	3	4	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	4	3	----------	1	24	7	3
Cleveland	83	22	6	2	1	285	142	10
Columbus	23	2	3	1	0	12	1	3
Toledo	63	4	4	----------	0	22	4	3
Indiana:								
Fort Wayne	3	1	1	----------	0	3	0	5
Indianapolis	5	2	1	----------	1	63	5	10
South Bend	1	1	0	----------	0	3	0	1
Terre Haute	0	0	0	----------	0	3	0	1
Illinois:								
Chicago	223	78	78	2	4	768	64	30
Springfield	17	0	1	----------	0	1	2	5

City reports for week ended June 27, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—contd.								
Michigan:								
Detroit	77	36	22	1	0	51	34	8
Flint	26	1	0	----------	0	1	6	0
Grand Rapids	2	0	0	----------	1	42	0	1
Wisconsin:								
Kenosha	3	0	0	----------	0	3	47	0
Madison	4	0	1	----------	----------	3	18	----------
Milwaukee	111	9	2	2	2	257	95	6
Racine	8	1	1	----------	0	0	15	0
Superior	13	0	0	----------	0	0	0	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	18	0	0	----------	0	0	0	2
Minneapolis	26	9	5	----------	0	43	5	3
St. Paul	67	7	0	----------	0	50	0	1
Iowa:								
Davenport	3	0	0	----------	----------	0	0	----------
Des Moines	0	1	0	----------	----------	0	0	----------
Sioux City	5	1	0	----------	----------	2	4	----------
Waterloo	0	0	0	----------	----------	2	0	----------
Missouri:								
Kansas City	3	2	5	----------	0	44	0	2
St. Joseph	0	0	0	----------	0	4	1	0
St. Louis	10	22	10	----------	----------	4	11	1
North Dakota:								
Fargo	0	0	0	----------	0	----------	4	1
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Aberdeen	4	0	0	----------	----------	0	0	----------
Sioux Falls	0	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	10	2	2	----------	0	3	4	0
Kansas:								
Topeka	2	1	0	----------	0	3	34	0
Wichita	0	0	0	----------	0	0	2	3
SOUTH ATLANTIC								
Delaware:								
Wilmington	2	1	3	----------	0	6	4	3
Maryland:								
Baltimore	21	13	8	----------	1	123	24	18
Cumberland	0	0	0	----------	0	2	0	0
Frederick	0	0	0	----------	0	6	0	0
District of Columbia:								
Washington	17	6	8	1	0	32	0	5
Virginia:								
Lynchburg	3	0	0	----------	0	0	1	2
Norfolk	2	0	1	----------	0	4	0	3
Richmond	0	1	1	----------	0	18	0	0
Roanoke	4	0	0	----------	0	3	0	0
West Virginia:								
Charleston	0	0	0	----------	0	1	2	3
Wheeling	3	0	1	----------	0	2	0	1
North Carolina:								
Raleigh	1	0	0	----------	0	15	0	1
Wilmington	3	0	0	----------	0	1	0	1
Winston-Salem	1	0	0	----------	0	54	2	0
South Carolina:								
Charleston	0	0	0	11	0	0	0	2
Columbia	0	0	0	----------	0	1	3	7
Greenville	0	0	0	----------	0	0	0	0
Georgia:								
Atlanta	1	1	0	1	1	13	0	6
Brunswick	0	0	0	----------	0	0	1	0
Savannah	2	0	1	----------	0	18	9	3

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City reports for week ended June 27, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—continued								
Florida:								
Miami	3	1	2		0	16	0	3
St. Petersburg		0			0			0
Tampa	0	1	1		1	4	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	1		0	0	0	2
Tennessee:								
Memphis	4	0	0		1	74	0	7
Nashville	0	0	0		0	23	0	3
Alabama:								
Birmingham	0	1	0		0	1	0	9
Mobile	0	0	2		0	0	0	1
Montgomery	0	0	1			3	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	1	0	0			0	0	
Little Rock	0	0	0		0	0	0	5
Louisiana:								
New Orleans	0	5	15	1	1	1	0	8
Shreveport	0	0	0		0	1	1	1
Oklahoma:								
Muskogee	1	0	0		0	1	0	0
Texas:								
Dallas	0	3	1	1	1	1	1	5
Fort Worth	3	1	3		1	1	0	0
Galveston	0	0	0		0	0	0	1
Houston	1	2	4		0	5	0	5
San Antonio	0	2	0		0	6	0	1
MOUNTAIN								
Montana:								
Billings	1	0	0		0	13	0	0
Great Falls	6	0	0		0	3	0	0
Helena	0	1	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	0	0	0
Colorado:								
Denver	17	7	1		0	32	17	2
Pueblo	2	1	0		0	6	0	0
New Mexico:								
Albuquerque	10	0	0		0	0	0	0
Utah:								
Salt Lake City	34	3	0		0	0	2	0
Nevada:								
Reno	0	0	0		0	1	0	2
PACIFIC								
Washington:								
Seattle	21	2	0			14	14	
Spokane	8	2	2			1	0	
Tacoma	8	1	1		0	0	4	1
Oregon:								
Portland	8	5	1		0	1	1	4
Salem	4	1	0		0	0	4	0
California:								
Los Angeles	25	29	22	5	0	51	9	10
Sacramento	2	1	0		0	43	0	8
San Francisco	17	10	1	3	1	76	1	3

City reports for week ended June 27, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	1	3	0	0	0	0	0	0	0	1	18
New Hampshire:											
Concord	0	0	0	0	0	1	0	0	0	0	7
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	3	
Burlington	0	1	0	6	0	0	0	0	0	0	4
Massachusetts:											
Boston	45	57	0	0	0	18	2	0	0	38	198
Fall River	2	6	0	0	0	4	1	0	0	7	13
Springfield	3	7	0	0	0	0	0	0	0	4	22
Worcester	7	12	0	0	0	4	0	0	0	4	
Rhode Island:											
Pawtucket	1		0				0				
Providence	5	9	0	0	0	1	0	0	0	0	63
Connecticut:											
Bridgeport	5	1	0	0	0	1	0	0	0	0	31
Hartford	2		0				0				
New Haven	2	1	0	0	0	1	1	0	0	2	39
MIDDLE ATLANTIC											
New York:											
Buffalo	17	16	0	2	0	7	1	0	0	14	137
New York	103	195	0	0	0	107	11	6	1	221	1,410
Rochester	6	15	0	0	0	3	0	0	0	3	63
Syracuse	5	14	0	0	0	2	0	0	0	16	52
New Jersey:											
Camden	4	2	0	0	0	1	0	0	0	1	27
Newark	15	8	0	0	0	8	0	1	0	93	89
Trenton	2	4	0	0	0	2	0	0	0	1	35
Pennsylvania:											
Philadelphia	56	119	0	0	0	26	2	1	0	67	402
Pittsburgh	20	61	0	0	0	14	0	0	0	59	156
Reading	2	1	0	0	0	2	0	0	0	1	27
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	8	23	1	0	0	10	1	0	0	7	147
Cleveland	26	23	0	0	0	18	1	1	0	51	190
Columbus	4	4	1	1	0	5	1	0	0	2	71
Toledo	10	4	0	1	0	2	0	1	1	34	63
Indiana:											
Fort Wayne	1	0	1	0	0	2	0	0	0	1	34
Indianapolis	6	10	5	5	0	3	0	0	0	38	
South Bend	2	2	0	1	0	0	0	2	0	1	16
Terre Haute	1	1	0	0	0	0	0	0	0	1	15
Illinois:											
Chicago	82	164	1	0	0	55	2	1	0	77	681
Springfield	2	1	0	1	0	1	0	4	0	3	34
Michigan:											
Detroit	69	125	1	0	0	23	1	2	0	129	270
Flint	8	14	1	0	0	2	0	0	0	3	10
Grand Rapids	6	5	0	0	0	2	0	0	0	7	37
Wisconsin:											
Kenosha	0	4	0	0	0	0	0	0	0	2	6
Madison	2	0	0	0			0	1		0	
Milwaukee	19	15	0	0	0	4	1	0	0	27	99
Racine	2	4	0	0	0	3	0	0	0	16	9
Superior	2	0	0	0	0	1	0	0	0	0	8
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	0	0	0	0	2	0	0	0	0	22
Minneapolis	20	9	2	0	0	4	0	1	0	3	97
St. Paul	12	5	0	2	0	2	1	1	0	31	61
Iowa:											
Davenport	0	2	1	10			0	0		0	
Des Moines	3	2	1	7			0	0		0	53
Sioux City	1	1	1	1			0	0		6	
Waterloo	1	0	0	0			0	0		6	

City reports for week ended June 27, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—con.											
Missouri:											
Kansas City	5	1	0	0	0	7	0	0	0	14	11
St. Joseph	0	0	1	0	0	0	0	0	0	7	8
St. Louis	14	22	1	2	0	17	2	3	0	48	294
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	3	7
Grand Forks	0	0	0	0	-------	-------	0	0	-------	0	-------
South Dakota:											
Aberdeen	1	0	0	0	-------	-------	0	0	-------	0	-------
Sioux Falls	0	0	0	2	-------	-------	0	0	-------	0	9
Nebraska:											
Omaha	2	3	2	4	0	1	0	0	0	6	44
Kansas:											
Topeka	1	0	0	0	0	0	0	0	1	8	12
Wichita	2	0	0	1	0	1	0	0	0	3	24
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	1	0	0	0	1	0	0	0	5	20
Maryland:											
Baltimore	23	19	0	0	0	16	2	0	0	64	215
Cumberland	0	3	0	0	0	1	0	0	0	0	7
Frederick	0	0	0	0	0	0	0	0	0	0	4
District of Columbia:											
Washington	11	8	1	0	0	5	1	0	0	15	127
Virginia:											
Lynchburg	1	0	0	0	0	0	1	1	0	1	10
Norfolk	1	0	0	0	0	3	0	1	0	1	-------
Richmond	1	3	0	0	0	4	1	2	0	3	40
Roanoke	0	0	0	0	0	0	0	0	0	0	12
West Virginia:											
Charleston	0	1	1	0	0	0	1	1	0	6	36
Wheeling	1	0	0	0	0	0	0	0	0	1	11
North Carolina:											
Raleigh	0	1	0	0	0	0	0	1	0	12	13
Wilmington	0	0	0	0	0	0	0	0	0	6	8
Winston-Salem	0	3	0	0	0	2	0	1	0	10	14
South Carolina:											
Charleston	0	0	0	0	0	0	1	0	0	0	18
Columbia	0	1	0	0	0	2	2	1	0	2	47
Greenville	0	0	0	0	0	0	1	0	0	1	-------
Georgia:											
Atlanta	3	7	2	6	0	2	0	0	0	0	65
Brunswick	0	0	0	0	0	1	0	0	0	0	3
Savannah	0	0	0	0	0	2	1	0	0	4	37
Florida:											
Miami	0	0	0	0	0	0	0	0	0	2	17
St. Petersburg	0	-------	0	-------	0	0	0	-------	0	-------	7
Tampa	0	0	0	0	0	0	1	1	0	1	27
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	3	0	0	0	0	0	0	0	1	13
Tennessee:											
Memphis	2	4	0	3	0	8	3	4	1	44	79
Nashville	1	1	0	0	0	0	2	1	0	0	51
Alabama:											
Birmingham	1	0	1	0	0	8	1	0	0	14	62
Mobile	0	0	0	0	0	0	2	0	0	0	17
Montgomery	0	3	0	0	-------	-------	0	1	-------	0	-------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	1	0	1	-------	-------	1	0	-------	2	-------
Little Rock	0	0	0	0	0	2	1	0	0	0	-------
Louisiana:											
New Orleans	4	6	0	1	0	12	3	3	0	1	126
Shreveport	1	0	0	0	0	1	0	2	0	3	24

City reports for week ended June 27, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—contd.											
Oklahoma:											
Muskogee	0	0	1	0	0	0	1	0	0	1	--------
Texas:											
Dallas	2	2	1	7	0	3	1	3	0	16	67
Fort Worth	0	1	1	1	0	2	1	0	0	0	33
Galveston	0	0	0	0	0	1	0	1	0	0	15
Houston	1	0	1	0	0	2	1	6	0	0	63
San Antonio	0	0	0	0	0	9	1	1	0	4	55
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	5	3
Great Falls	0	0	0	0	0	0	0	1	0	4	6
Helena	0	0	0	1	0	0	0	0	0	0	4
Missoula	0	1	0	0	0	0	0	0	0	0	7
Idaho:											
Boise	0	0	0	7	0	0	0	0	0	1	5
Colorado:											
Denver	7	7	0	0	0	6	1	0	0	47	66
Pueblo	0	0	0	0	0	1	0	4	0	3	11
New Mexico:											
Albuquerque	1	0	0	0	0	4	0	1	0	1	10
Utah:											
Salt Lake City	2	3	0	0	0	0	0	1	0	18	24
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	5	7	1	0	--------	--------	0	0	--------	32	--------
Spokane	8	0	4	2	--------	--------	0	0	--------	2	--------
Tacoma	2	2	1	0	0	1	0	0	0	3	25
Oregon:											
Portland	4	1	7	3	0	2	0	0	0	0	57
Salem	1	1	0	0	0	0	0	0	0	0	--------
California:											
Los Angeles	23	14	4	1	0	28	2	2	0	30	273
Sacramento	2	0	1	0	0	2	0	4	0	3	30
San Francisco	12	6	0	0	0	10	0	1	0	13	109

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	0	0	0	0	0	0	1	0
Worcester	1	0	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York City	10	3	1	2	0	0	1	6	1
New Jersey:									
Newark	1	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	3	1	0	0	0	0	0	0	0
Pittsburgh	5	1	0	1	0	0	0	0	0

City reports for week ended June 27, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	3	2	0	0	0	0	0	0	0
Indiana:									
Indianapolis	1	2	0	0	0	0	0	1	1
Illinois:									
Chicago	5	3	1	0	0	0	0	1	2
Michigan:									
Detroit	0	0	1	0	0	0	1	0	0
Grand Rapids	0	0	2	0	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
St. Paul	0	0	0	0	0	0	0	1	0
Missouri:									
Kansas City	0	0	0	0	1	1	0	0	0
St. Louis	2	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore [1]	2	0	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	1	0	0	1	0
Wilmington	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	0	3	0	0	0
Columbia	2	0	0	0	0	2	0	0	0
Georgia:									
Atlanta [1]	0	0	0	0	1	1	0	1	1
Savannah [1]	0	0	0	0	2	0	0	0	0
Florida:									
St. Petersburg	0	1	0	0	0	0	0	0	0
Tampa	0	0	0	0	0	0	0	1	0
EAST SOUTH CENTRAL									
Tennessee:									
Nashville	2	3	0	0	0	0	0	0	0
Alabama:									
Birmingham	0	0	0	0	1	1	0	0	0
Mobile	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
Shreveport	0	0	0	0	0	1	0	0	
Oklahoma:									
Muskogee	1	1	0	0	0	0	0	0	0
Texas:									
Dallas	0	0	0	0	3	1	0	0	0
Houston	0	1	0	0	0	0	0	0	0
MOUNTAIN									
New Mexico:									
Albuquerque	0	0	0	0	1	0	0	0	0
Utah:									
Salt Lake	1	0	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	1	1	0	0	0	0	0	0	0
San Francisco	0	0	1	0	0	0	0	0	0

[1] Typhus fever, 1 death and 2 cases; 1 death at Baltimore, Md.; 1 case at Atlanta, Ga.; and 1 case at Savannah, Ga.

The following tables give the rates per 100,000 population, for 98 cities for the 5-week period ended June 27, 1931, compared with those for a like period ended June 28, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, May 24 to June 27, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930
98 cities	59	76	67	75	54	78	66	66	[2] 54	65
New England	50	56	46	94	41	39	41	39	[2] 76	68
Middle Atlantic	58	67	74	68	55	78	65	77	47	62
East North Central	81	110	75	112	64	128	89	92	72	97
West North Central	54	77	55	52	61	60	52	35	42	72
South Atlantic	41	60	39	54	49	44	43	36	45	26
East South Central	17	36	12	12	17	12	6	12	23	12
West South Central	54	49	68	38	27	80	85	80	68	35
Mountain	52	44	191	18	35	35	26	9	9	0
Pacific	37	67	49	65	53	36	71	47	51	55

MEASLES CASE RATES

	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930
98 cities	1,114	911	1,096	934	876	815	723	642	[2] 572	489
New England	935	1,558	933	1,596	601	1,546	635	1,144	[2] 491	832
Middle Atlantic	1,187	940	1,101	1,021	838	1,033	663	776	511	607
East North Central	1,304	524	1,446	512	1,304	453	1,178	377	921	331
West North Central	641	525	817	420	448	370	331	302	296	269
South Atlantic	2,089	793	1,473	523	1,102	397	766	411	591	256
East South Central	1,047	335	1,140	371	820	161	844	239	588	227
West South Central	294	453	254	115	149	94	88	77	47	17
Mountain	461	5,674	870	5,665	705	3,410	609	2,687	479	1,454
Pacific	492	1,397	511	1,903	580	1,340	302	1,069	362	798

SCARLET FEVER CASE RATES

	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930
98 cities	306	182	310	208	269	188	221	141	[2] 168	107
New England	351	307	414	252	291	218	272	126	[2] 260	135
Middle Atlantic	304	162	355	186	318	147	280	112	194	85
East North Central	438	264	422	293	386	301	310	226	240	182
West North Central	291	213	258	265	168	238	132	151	78	99
South Atlantic	239	126	197	170	122	158	77	106	93	68
East South Central	297	72	151	96	169	48	93	60	64	54
West South Central	51	14	41	73	88	35	30	98	30	38
Mountain	165	97	104	194	96	132	78	203	96	62
Pacific	110	71	86	93	80	97	57	73	57	49

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Pawtucket, R. I., and Hartford, Conn., not included.

Summary of weekly reports from cities, May 24 to June 27, 1931—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930
98 cities	15	15	14	20	10	14	7	10	[2] 8	13
New England	0	0	0	0	0	0	5	0	[2] 0	0
Middle Atlantic	1	1	0	1	1	0	0	0	1	0
East North Central	11	12	16	8	12	11	5	7	5	10
West North Central	88	56	42	118	36	54	29	31	19	52
South Atlantic	24	10	18	4	0	8	14	2	12	10
East South Central	6	30	17	30	23	36	12	18	17	6
West South Central	37	14	41	21	24	21	20	24	30	21
Mountain	26	62	26	62	17	35	0	35	70	53
Pacific	12	49	33	59	25	49	16	30	6	43

TYPHOID FEVER CASE RATES

	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930
98 cities	7	7	6	8	7	9	9	8	[2] 10	13
New England	2	12	2	5	0	10	10	0	[2] 0	10
Middle Atlantic	8	3	5	6	7	8	12	4	4	5
East North Central	2	2	1	4	4	4	4	2	6	10
West North Central	4	10	10	10	4	6	6	8	10	14
South Atlantic	22	14	20	22	14	16	14	24	16	40
East South Central	12	36	17	12	17	24	12	48	35	60
West South Central	7	21	10	35	24	17	14	24	54	31
Mountain	17	9	17	0	9	9	0	9	52	85
Pacific	2	8	4	2	12	16	10	6	14	4

INFLUENZA DEATH RATES

	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930
91 cities	7	4	6	5	4	6	7	4	[2] 4	3
New England	10	0	2	0	0	2	7	2	[2] 3	0
Middle Atlantic	3	4	5	4	4	5	8	5	2	2
East North Central	5	4	2	4	4	6	5	4	6	2
West North Central	9	3	6	12	6	15	6	0	0	0
South Atlantic	18	4	14	10	6	2	4	2	6	6
East South Central	19	32	38	13	13	13	0	13	6	13
West South Central	14	4	10	11	3	25	14	7	7	11
Mountain	17	18	0	9	0	0	9	0	0	0
Pacific	5	2	7	2	5	5	5	0	2	2

PNEUMONIA DEATH RATES

	May 30, 1931	May 31, 1930	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930
91 cities	101	78	86	83	75	83	70	72	[2] 67	66
New England	111	97	120	80	60	89	65	75	[2] 57	53
Middle Atlantic	109	89	102	100	88	96	72	78	76	71
East North Central	75	53	59	58	60	66	60	52	51	56
West North Central	133	69	138	132	71	78	106	111	38	87
South Atlantic	132	90	77	102	83	80	89	70	103	72
East South Central	183	97	76	71	145	97	82	117	139	91
West South Central	128	121	86	78	79	100	76	64	90	85
Mountain	70	79	87	115	70	88	78	132	35	79
Pacific	43	52	48	32	43	57	34	60	41	45

[2] Pawtucket, R. I., and Hartford, Conn., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended June 20, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended June 20, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia [1]					
New Brunswick					5
Quebec					6
Ontario	4	1		3	5
Manitoba					1
Saskatchewan	1			18	
Alberta [1]					
British Columbia			1		3
Total	5	1	1	21	20

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended June 27, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended June 27, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Ophthalmia neonatorum	4
Chicken pox	36	Puerperal septicemia	2
Diphtheria	30	Scarlet fever	63
Erysipelas	2	Tuberculosis	94
German measles	2	Typhoid fever	15
Measles	208	Whooping cough	11
Mumps	9		

CHINA

Shanghai—Meningitis.—Meningitis has been reported in Shanghai, China, as follows:

Week ended—	Cases	Deaths	Week ended—	Cases	Deaths
May 30, 1931		6	June 13, 1931	3	9
June 6, 1931	5	7	June 20, 1931	1	6

CUBA

Habana—Communicable diseases—Four weeks ended June 20, 1931.—During the four weeks ended June 20, 1931, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	25		Scarlet fever	1	
Diphtheria	10	2	Tuberculosis	26	9
Malaria	2		Typhoid fever [1]	33	4
Measles	73	1			

[1] Many of these cases are from the Island of Cuba, outside of Habana.

DENMARK

Communicable diseases—April, 1931.—During the month of April, 1931, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	6	Paratyphoid fever	3
Chicken pox	41	Puerperal fever	20
Diphtheria and croup	291	Scabies	758
Erysipelas	283	Scarlet fever	139
German measles	19	Syphilis	140
Influenza	9, 595	Tetanus	4
Lethargic encephalitis	5	Typhoid fever	4
Measles	1, 514	Undulant fever (Bac. abort. Bang.)	52
Mumps	492	Whooping cough	1, 492

TRINIDAD

Port of Spain—Vital statistics—May, 1930, 1931.—The following statistics for the month of May, 1930 and 1931, are taken from a report issued by the public health department of Port of Spain, Trinidad:

	May			May	
	1930	1931		1930	1931
Number of births	151	160	Death rate per 1,000 population	20.1	17.7
Birth rate per 1,000 population	26.4	27.4	Deaths under 1 year	16	12
Number of deaths	115	103	Deaths under 1 year per 1,000 births	106	75

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931			May, 1931					June, 1931				July 4, 1931
						11	18	25	2	9	16	23	30	6	13	20	27	
Ceylon: Colombo	C				1								1	1				
	D												1	1				
China: Canton	C					1						2				1		
	D											1						
India	C	10,687	15,334	11,544	8,968	3,161	3,067	2,668	2,566	3,242	3,013							
	D	5,689	8,123	6,131	4,550	1,571	1,550	1,360	1,286	1,806	1,598							
Bombay	C		21			2												
	D		9			1												
Calcutta	C	28	121	170	436	95	82	62	71	72	89	49	55	94	74	50		
	D	20	86	112	256	55	51	26	44	39	44	34	32	57	47	26		
Karikal	C	1		9	12	10	8	1		10		1	1					
	D			8	12	5	8	1		5		1	1					
Madras	C	201	90	72	20	3	1	4	18	18	23	11		3	6			
	D	67	47	29	10	5	1	3	5	6	8	2	1		1			
Negapatam	D		3	3														
Rangoon	C	1											2			2		
	D	1	1										1			1		
Tuticorin	C	1	1	1														
Vizagapatam	C																1	
India (French): Chandernagor	C	2	1	5	7	3	2	1		3		1			1			
	D	3	1	5	6	3	2			3		1			1			
Pondicherry	C	31	19	100	100	5	3	5	11	3	8	2	4	1	1	1		
	D	21	11	34	18	1	3				3		4	1	1	1		
India (Portuguese)	C	1																
Indo-China (see also table below): Pnompenh	C		4	9		1	1							1				
	D		2	5	1			1		2				1				
Saigon and Cholon	C	9	6	4	5	2	3	7	15	25	23	34	22	18	16	14	13	
	D	4	3	4	5		3	6	13	20	18	25	13	9	14	9	9	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar 7, 1931	Mar. 8–Apr. 4, 1931	Week ended—April, 1931			May, 1931					June, 1931				July 4, 1931
						11	18	25	2	9	16	23	30	6	13	20	27	
Persia: Rafsanjan [1]	C									31	1	4						
	D									12		2						
Philippine Islands: [2]																		
Iloilo	C	1	2															
	D	1	2															
Provinces—																		
Capiz	C		59	186	48		3	8	18	11	3		3	4				
	D		47	146	41		3	8	13	11	3		1	4				
Iloilo	C	28	145	95	7									8	7	5	6	24
	D	22	110	65	4									6	5	6	4	22
Masbate	C				21													
	D				9													
Negros, Occidental	C	120	90	4													2	
	D	97	56	4													1	
Negros, Oriental	C		1															
	D		1															
Pampanga	C									1								
Samar	C	17																
	D	9																
Siam	C	2	3	1	10	1	1	1	13	11					1	3		
	D	2	1		2				4	3					1	1		
Ayudhaya District	C				1													
Bangkok	C	2	3	2	3	1		1	1	1	1	1						
	D	2	1	1	2			1	1			1						
Bismulok Province	C				8													
	D				2													
On vessel:																		
S. S. Arankola, at Rangoon from Calcutta	C												1					
S. S. City of Eastborne, at Calcutta from Cocanada	C													1				
S. S. Tairea, at Penang from Calcutta	C														1			

Place		December, 1930	January, 1931			February, 1931			March, 1931			April, 1931			May, 1931		
			1–10	11–20	21–31	1–10	11–20	21–28	1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20	21–31
Indo-China (French) (see also table above):																	
Cambodia [3]	C	28	7	19	36	71	35	19	14		65					44	40
Cochin-China [3]	C	8	7	4	13	5	5	19	39		33				1	52	75

[1] From May 11 to 30, 1931, 109 cases of cholera and 57 deaths were reported at Rafsanjan, in Kerman District, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended—											
						April, 1931			May, 1931					June, 1931			
						11	18	25	2	9	16	23	30	6	13	20	27
Algeria:																	
Algiers	C	1	2	1	1												
	D				1												
Bone	C		1											1			
Constantine, vicinity of	C	50	1	1													
	D		1														
Philippeville	C	1															
	D	1															
Argentina:																	
Cordoba Province	C		1	2													
Entre Rios Province—Diamante	C			2													
Jujuy Province—Palpala	C		1	1													
Santa Fe	C			2													
Belgian Congo	C				2										1		
	D				2										1		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13	20	27
British East Africa (see also table below):																	
Tanganyika	C	2		22	8			3	15	17	5						
	D	2		4	1			10	11	11	2						
Uganda	C	67	25	15	19	8	3	10	14	11	33						
	D	67	24	15	19	8	3	9	12	11	26						
Ceylon: Colombo	C	9	8	11	8	1	3			1							
	D	9	6	13	7	1	2			1							
Plague-infected rats			2	3	4		1					5					
China: Amoy	C									1							
	D									1							
Dutch East Indies:																	
Batavia and West Java	C	239	180	141	84	19	24	20	11	18	12						
	D	238	168	128	80	18	23	20	10	18	12						
East Java and Madura	C		4	1	4			1		1							
	D		4	1	4			1		1							
Java and Madura	D	615	427	376	277	58	73	70	42	47	41	46	42				
Egypt:																	
Alexandria	C	3	1	2	1										2	3	1
	D															3	1
Plague-infected rats		1	1	1													
Assiout	C	7	26	41	18	5	16	8	3	4	5	8	1	4		5	
	D	1	6	11	6		11	4	2	2	4	1					
Beni-Suef	C		1					10	2	3		2					
	D		1					3		1		2					
Cairo	C				1												
Deirout	C		21	16					3	7	1		2	3			
	D		4	4					1	2	2			1			
Gharbieh	C		1												1		
	D		1												1		
Girga	C	7	1		86	31	9	4		1	1	5					
	D	2	1		24	13	3	5	1	1	1						
Kena	C				5			3				1					
	D				2			1				1					
Manfalut	C	23	30	15	17												
	D	5	6	5	3												

Minieh	C		2		3		1			5		1		3			
	D		1		2					2		1		1			
Port Said	C														1	1	
Hawaii Territory: Hamakua—Plague-infected rats												1					
India	C	3,740	5,335	5,457	9,139	2,503	1,603	1,258	778	434	139						
	D	2,226	3,422	3,661	7,037	1,980	1,377	1,092	750	385	143						
Bassein	C	2	4	1					1			1					
	D	1	3	1					1			1					
Bombay	C		1	1	4	4	4	1	2	5		1	1				
	D		1	1	3	4	4		3	4	1	1					
Plague-infected rats		38	34	32	70	34	43	30	30	26	30	17	21	10	10	10	
Calcutta	C					1	1										
	D					1	1										
Madras Presidency	C	220	312	74	28	3				1	1						
	D	154	182	46	21	2					1						
Rangoon	C	2	2		1	1				1			1		1		
	D	1	1		1	1				1			1		1		
Plague-infected rats		2	4	8	7	1	3			1	1	3	2		3		
Indo-China (see also table below): Pnompenh	C	1	7	1										1		1	
	D	1	7	4	6	2	1	1						1		1	
Iraq:																	
Baghdad	C		5	3	8		5	10	8	7	10	4	2	10	6	1	6
	D		4	2	5		2	5	1	3	4	2		1	4	1	3
Maudhan	C												2				
Madagascar (see also table below): Tamatave	C	2	9														
Morocco	C	19	13														
	D	8	4														
Nigeria: Lagos	C	5	1			2	2	1									
	D	5	1			2	2	1									
Plague-infected rats		5				3	3										
Peru (see table below).																	
Senegal (see table below).																	
Siam	C		4	18	31	1				1							
	D		2	14	7	1				1							
Bangkok	C	3	8	6	29												
	D	3	8	5	6												
Nagara Rajsima	C	17	9	7	1												
	D	10	10	6													
Syria: Beirut	C	1	1	1													
Tripolitania	C		8	1	1												
	D		3														
Tunisia: Tunis	C	13	1	14	10	5	7		4	7		8	1				
	D			7	4	4	2		2	3							
Union of Socialist Soviet Republics:																	
Gouranduz	D		28														
Transcaucasia—Karabakh	C		6														
Union of South Africa:																	
Cape Province	C					2	1										
Orange Free State	C	2	P	1	6	1	1					1					
	D	2		1	1	1	1										
On vessel: S. S. Marionga. Thermiotis at Avonmouth	C	1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
British East Africa (see also table above):							
Kenya	C	69	21	7	345	209	
Indo-China (see also table above)	C			4	2		1
Madagascar (see also table above):							
Ambositra Province	C	100	92	70	30		
	D	96	88	66	29		
Antsirabe Province	C	66	84	83	48		
	D	57	79	74	47		
Miarinarivo Province	C	28	31	19	6		
	D	26	29	19	6		
Moramanga Province	C	7	7	1			
	D	5	7	1			
Tananarive Province	C	92	145	90	41		
	D	89	139	81	40		
Peru	C	29	12				
	D	8	6				
Senegal:							
Baol [1]	C					4	
	D					3	
Dakar [1]	C				2	63	64
	D				1	49	56
Louga [1]	C			14	1	5	
	D			6		2	
Rufisque [1]	C		2			1	2
Thies [1]	C						12
	D						3
Tivaouane [1]	C				4	19	3
	D					11	2

[1] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13	20	27
Algeria:																	
Algiers	C	1	1	1	2		2					1				1	
Bone	C		1														
Constantine	C				1					1							
Arabia: Aden	C		1	1													
Belgian Congo	C	79	50														
Belgium	C			1													
Brazil: Porto Alegre (alastrim)	C		3	7	49	20	19	8	6	2	4	7					
	D			1	1												

British East Africa (see also table below):																	
Tanganyika	C	84	70	91	8												
	D	4	5	13	3												
British South Africa: Southern Rhodesia	C	18	13														
Canada:																	
Alberta	C	19	7	1													
British Columbia	C	3	2	8													
Manitoba	C		1	1													
Winnipeg	C	1		1						4							
Nova Scotia	C		1		1												
Ontario	C	17	49	29	9	4		6	7	17	5		3		4	3	14
Kingston	C	6	1	1				2	3								
North Bay	C	2		1													
Ottawa	C	2	3	1													
Sault Ste. Marie	C	1	30	2		3	1				1					1	
Toronto	C				2		4			1							
Quebec	C		2													1	
Saskatchewan	C		38	63	58	5	16	3	22	7	15	18	8	7	16	18	13
Regina	C			1	2			2		2							
Canary Islands: Las Palmas	C				1												
Chile: Chanaral	C												1				
China:																	
Amoy	C				1				2	2	1	1	2	1	2		
	D				1				1	1		1	1	1	1		
Canton	C			3	7	1	2	1				1	2			1	
Chungking	C	2															
Foochow	C	P	P	P	P	P			P				P				
Hong Kong	C	1	1	9	2		1	2					1				
	D			3	2			1		1			1				
Manchuria—																	
Harbin	C		1	4	2					1	1		1				
Kwantung—Dairen	C	1			2			1	1	1			1				
Nanking	C	P	P	P	P	P	P	P	P	P	P	P					
Shanghai—																	
Foreigners only	C	14	12	16	6	2	1	2	2	1	4	1	1	2		2	
Including natives	D	11	13	14	10	2	7	4	5	1		3	3	1	5	4	3
Swatow	D	5	7	13	26	2											
Tientsin	C		1							2							
Chosen (see table below).																	
Colombia: Cali	D									1							
Dutch East Indies:																	
Batavia and West Java	C	4	29	2	1						1						
	D	2	2	1													
East Java and Madura	C												1				
Finland	C						1										
France (see table below).																	
Great Britain:																	
England and Wales	C	665	958	745	795	177	163	212	192	186	166	111	107	83	94	62	
Bradford	C	1	4	1	2	1		1	4	1	3	1	3			5	
Leeds	C	2			1		1	1		1		1					
London	C	161	140	98	147	51	39	84	53	66	44	37	36	25	50	31	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931 11	18	25	May, 1931 2	9	16	23	30	June, 1931 6	13	20	27
Great Britain—Continued.																	
England and Wales—Continued.																	
London and Great Towns	C	560	693	683	554	142	126	162	128	139	108	84	72	57	84	49	
	D			1		1		1						1			
Sheffield	C		3	32	10	4	2	1									
Stoke-on-Trent	C		1	1													
Greece (see table below).																	
Honduras:																	
Amapala	C			1													
Ocotepeque and Gracias districts	C			P													
Puerto Castilla	C	4	11	3													
Tegucigalpa	C							1									
Tela	C					1											
India	C	5,623	9,623	12,222	11,791	3,990	3,749	3,468	3,068	3,422	2,836						
	D	1,381	2,245	2,660	2,261	807	684	680	752	709	572						
Bassein	C												1				
Bombay	C	2	7	6	10	2	2	1	3	3		6	1		2		
	D	2	1	3	4	1			4	1	1	1	1		1		
Calcutta	C	59	143	251	283	101	60	61	65	24	30	19	16	14	19	14	
	D	40	100	188	203	78	42	50	54	18	25	17	15	12	18	11	
Cochin	C	15	29	59	46	10	11	12	6	3							
	D	1		3													
Karachi	C		3	4	4		5		1							2	
	D		2		2											1	
Madras	C	4	16	8	22	12	4	1	2	1	3	3	1			1	
	D			1	3	2	1	1	1		1	5					
Moulmein	C		2														
Negapatam	C					1	1		1							2	
Rangoon	C			4	3	2	2	1	6	7	5		1		1	4	
	D				1				1	2	1	1	1		1		
Vizagapatam	C		1	8	2	2	2	4	2			5	1	2	1		
	D			2	1	1		1				1			1		

India (French):																	
Chandernagor	C	5	9	12	14	3	1	4	2	3		4					
	D	3	1	1	2	3	1	2	1	3		2					
Karikal	C	3	5	19	3		1	1	2	1	1	1	1	1			
	D	2	4	18			1		2	1	1	1	1	1			
Pondicherry Province	C	34	45	19	14	3			3	1	2	[illegible]	1	3	2	1	
	D	32	45	19	14	3	3		3	1	2	[illegible]	1	3	2	1	
India (Portuguese)	C	4	5	14	8		19	2				3					
	D			3	3		4	2				1					
Indo-China (see also table below):																	
Pnompenh	C	2	1		1							1		2			
	D		1									1					
Saigon and Cholon	C		6	4	8	1					1		1				
	D		4	1	8	1					1						
Iraq:																	
Baghdad	C			9													
	D							1	1			1	2		1		
Basrah	C												2				
Mosul Liwa	C	1	3	5									2		1		
	D			1													
Ivory Coast (see table below).																	
Japan:																	
Kobe	C			2													
Taiwan	C		1														
Mexico (see also table below):																	
Jalisco (State)—Guadalajara	D		1		1				1	1		1			1		
Mexico City and surrounding territory	C	10		23	33	17	9	11	6	4	10	10	21	5	4		
	D	6	1	8	22	4	6	4		4	3	2	2	4	3		
Monterrey	C													1			
Torreon	C						1				1						
	D						2									1	2
Vera Cruz	C			3	2		1		1	1						1	1
Morocco (see table below).																	
Nicaragua: Porto Cabezas	C	2															
Nigeria: Lagos	C				2												
Panama Canal Zone	C		2														
Poland	C	25		1									3	1	1		
Portugal: Lisbon	C	72	103	40	52	8	18	11	19	19	14	16	18	5	17	12	
Siam	C	1	4	2				1				3					
	D	1															
Spain	C	P	P	P	P												
Straits Settlements	C	6	7	2	4	1		1									
	D	3	1	1	1	1	1	1									
Sudan (Anglo-Egyptian)	C	64	11	97	8				3		3		1				
	D	6	7	10	2								1				
Sudan (French) (see table below).																	
Syria (see table below).																	
Tunisia: Tunis	C	17	8		4												
Turkey (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P	P	P	P		P	P						
Orange Free State	C		P	P	P	P	P	P		P	P	P					
Transvaal	C	P	P	P	P												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931			May, 1931					June, 1931			
						11	18	25	2	9	16	23	30	6	13	20	27
Upper Volta	C	4		18	3		3			1	2		85	11		1	
	D	2			1								1				
On vessel:																	
S. S. Clan Mactoggart at Suez	C			2													
S. S. Muncaster Castle at Manila from Hong Kong	C	1															
S. S. Mahteran at Suez from Calcutta	C		1														
S. S. Clan Buchanan at Suez	C			2													
S. S. Rotterdam at Naples from Venice	C				1												
S. S. Clan McTavish at Manila from Chittagong	C						1										
S. S. Benevue at Sydney from Shanghai	C		1														
S. S. Clan MacBrayne at Cochin	C			1													
S. S. Chilka at Rangoon	C			1													
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C								1								
S. S. Talodi at Soakim	C										1						

Place		December, 1931	January, 1931			February, 1931			March, 1931			April, 1931			May. 1931		
			1–10	11=20	21–31	1–10	11–20	21–28	1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31
Indo-China (see also table above)	C	61	47	48	46	95	46	27	125		139	100				17	41
Ivory Coast	C	9															
Sudan (French)	C	139							4		P						
	D	20															
Syria: Beirut	C			1													

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen	C		1		11		
	D		1		3		
France	C		4	16	15		
Greece	C	4		4			3
Mexico (see also table above)	D	1		3		1	1
Morocco	C	25		4	5	7	43
Turkey	C	116	63	37	1		9
	D	9	7	[illegible]			

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931: 14	21	28	April, 1931: 4	11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13	20
Algeria:																			
Algiers	C			2			3				2	1	3		1	3	4	4	
Constantine Department	C	6	31	4		1		2	2		6	1	8	3	5	6	6	3	1
Oran	C		3	1							1					2	2		
Australia, Western	C	3						1					1						
Bulgaria	C	1	13	5				9		26	4			5	8	3	11		
	D							2		3				1		3	2		
Chile: Valparaiso	D			1															
China:																			
Canton	C		2		1														
Manchuria—Harbin	C		3	5			3				8								
Shanghai	C		2																
Tientsin	C								1	1									
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C									1								1	1
	D																		
Beheira Province	C	1							3	1									
	D	1							2										
Cairo	C	1	1																
Port Said	C		1																
Eritrea: Asmara	C				1														
Great Britain: Scotland	C		1																
Fife County	C															1			
Glasgow	C		2																
	D		1																
Greece (see table below).																			
Guatemala.[1]																			
Iraq: Baghdad	C			5	1		1						2						
	D			1									2						
Irish Free State:																			
Cork County—Skibbereen	C																	1	
Kerry County—Dingle	C												1						
Mayo County—Belmullet	C									1									

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reported an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Week ended— March, 1931 14	March 21	March 28	April, 1931 4	April 11	April 18	April 25	May, 1931 2	May 9	May 16	May 23	May 30	June, 1931 6	June 13	June 20
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico (see also table below):																			
Durango	D		1																
Mexico City, including municipalities in Federal District	C	12	39	35	46	66	73	31	67	34	38	31	16	27	17	15	7	12	
	D	10	34	16	20	13	31	20	18	7	17	14	9	7	7	10	4	4	
San Luis Potosi	D			5	1	1	2	1	1	2					1	1			
Morocco	C	8	8	28	2	2	3			1		12		13	29			31	
	D		2	1								1		2	2			2	
Palestine	C	4	2	3	2	1	1	1	1	2		2	2	1	1			2	3
Panama Canal Zone—Balboa	C													1					
Paraguay: Asuncion	D		4	1	1														
Poland	C	63	106	189	62	58	85	82	93	176	140	129	92	81	58	67		48	
	D	3	8	19	4		7	4	8	7	6	7	6	4	5	3		2	
Portugal: Oporto	C		1																
Rumania	C	113	193	152	55	53	52	54	70				63	52	54				
	D	5	16	24	4	5	3	4	8				10	5	3				
Syria	C													1	3				
Tunisia:																			
Sbeitla, vicinity of	C							20	2			10							
	D							7											
Sfax	C						2												
Tunis	C		16	18	5	2	7		2		1	10	12	9	8			64	9
	D												1	2					
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	1		P	P	P	P	P		P	P	P				
Municipality of East London	C	3	3				P	P											
Natal	C	P	P	P		1	P	P	P	P	P	P	P		P				
Orange Free State	C	P	P	P	P				P	P	P			P	P				
Transvaal	C	P	P	P	P		P	P	P	P	P		P	P	P				
Yugoslavia (see table below).																			

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen: Seoul	C	[illegible]	1		3	4	
Czechoslovakia	C	14	60	26		5	
Greece	C	10	10	17	8	22	6
	D		2	2	1	3	
Latvia	C			12			
Lithuania	C	6	26	3	22	32	10
	D	3	3	1	2	3	
Mexico (see also table above)	D	47					
Turkey	C	2	17	18	15		3
Yugoslavia	C	1	20	12	10	43	14
	D	1	2		1	5	

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930-Jan. 10, 1931	Jan. 11-Feb. 7, 1931	Feb. 8-Mar. 7, 1931	Week ended— March, 1931			April, 1931				May, 1931					June, 1931	
					14	21	28	4	11	18	25	2	9	16	23	30	6	13
Brazil:																		
Bahia State	C				1	1												
Ceara State	C		1		2							2		1			1	
	D		1									2		1				
Minas Geraes State	C					2			1		2	2	1		1			
	D					1					1	1	1					
Rio de Janeiro State	C					1								1	1			
	D			1	1	1												
Cambucy	C		3	2	1													
	D		3	1														
Friburgo (imported)	C		1															
Padua	C		2	1														
	D		2	1														
Sergipe State	C																	1
British Cameroons: Mamfe	C													3				
	D													2				

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THE NEED FOR CONTINUED STUDY IN PUBLIC HEALTH WORK[1]

By W. S. Leathers, M. D., *Dean of the School of Medicine, Vanderbilt University, Nashville, Tenn.*

This is a rather academic subject, but it is one which is exceedingly important and, so far as I know, it is the first time that a topic of this kind has been presented to a conference of the personnel of State and local health departments. It is interesting that the State Commissioner of Public Health, Dr. E. L. Bishop, in his official capacity requested that this subject be placed on the program for this meeting. This title presupposes that one has had some opportunity to gain specific knowledge in the field of public health, either from a general point of view or in special fields. Having had such preparation prior to beginning practical public health work, it is desirable that a person develop for himself a program which will avoid the mistake of becoming a mere routine worker. Considering the many responsibilities which confront the busy all-time health officer and others engaged in practical public health work, it is a relatively easy matter to get into a rut. As a result, one's interest is often decreased, his perspective is circumscribed, and the vigor and efficiency with which he should carry on diminish. There is need for intellectual refreshment and a storing-up of mental reserve, so that the job can be done with a larger measure of success.

It is, therefore, pertinent that the question be asked, How may one who is engaged in what may be termed routine or practical public health work continue to study and keep informed concerning the advancements in preventive medicine and public health? There are a number of ways by which this may be accomplished; but unless one has the incentive to become more than a routine worker, it is probable that this principle will not be observed. Therefore, the first thing which I wish to stress is that a public health worker must have the

[1] Read before the annual conference of the personnel of Tennessee State and local Departments of Public Health, December, 1930. (From the Department of Preventive Medicine and Public Health of the School of Medicine of Vanderbilt University.)

incentive and, I may say, ambition to keep in the forefront in the field of public health. If we consider other professional groups, it is at once obvious that the practitioners of medicine who are most successful are those who read journals, who attend scientific meetings, and who otherwise avail themselves of opportunities for continued study. This is also true of engineers, successful teachers, or persons engaged in research. One who is engaged in investigative work must not only know what has been done in connection with a particular problem, but one must also project a plan of study which may ultimately lead to the solution of the question which one is endeavoring to answer. In the same manner it is important for public health workers to use every means possible to build up their professional status so that they will become stronger and more effective in their respective positions. A State health officer should be particularly interested in and contribute toward this outcome. This will be a means of maintaining a more enlightened and efficient State and local health personnel, and larger dividends will be declared in the expenditure of funds for the prevention and control of disease.

Speaking more specifically, what are some of the methods that may be used for continued study?

1. Every health worker should read and be informed on current literature bearing upon the particular field in which he is engaged. In order that this may be done, the health department, whether it be State or local, should provide three or more journals in which papers are published dealing with general or special phases of public health work. If a health officer is a member of the American Medical Association, which indeed he should be, he will receive regularly the weekly publication of that organization, the Journal of the American Medical Association. In this are published many papers of great value to public health officials. Then, there is the American Journal of Public Health, in which there is subject matter of interest and value not only to the health officer but also to the nurse, sanitary inspector, and others assuming administrative responsibilities in this field of medical service. The Journal of Preventive Medicine, which is the official publication of the John McCormick Institute of Infectious Diseases, also should be made available. This journal publishes papers on investigative work of definite value to the public health worker. Every health department should receive the publications of the United States Public Health Service, especially the PUBLIC HEALTH REPORTS, Public Health Bulletins, and the National Institute of Health Bulletins, which are free to health agencies. Certain journals dealing with special phases of clinical medicine and public health are indispensable, such as the American Journal of Hygiene, American Journal of Tropical Medicine, Bulletin of Hygiene, Journal of Industrial Hygiene, Public Health (official organ of the Society of Medical

Officers of Health of England), American Review of Tuberculosis, Tubercle, Journal of Social Hygiene, and the American Journal of Diseases of Children. The following journals would be valuable for the nursing personnel of a health department: The Public Health Nurse and the American Journal of Nursing. Lastly, the journal Municipal Sanitation will be useful in dealing with problems of sanitation, such as water supply, sewage disposal, refuse disposal, and similar matters. There is much material available; but unless there is a definite interest and effort made in its use, it will simply be put on the shelf. I make mention of these publications largely to emphasize the importance of reading one or more of them regularly.

2. A library should be provided with books on public health. The size of such a library will depend upon the extent of the organization. It is clear that the State health department should have a library not only providing opportunities for study of special topics but also for reference. Books and bound journals should be accumulated over a period of years so that in the course of time the State health department would have library facilities which could be used not only by members of its own staff but by others who may want to investigate special problems bearing upon preventive medicine and public health. A carefully selected list of books which a department of health will find most useful is given in the appendix.

Every local health department should provide some kind of a library for the use of its staff. If an interest is expressed in having a library and a plan is developed for acquiring books from time to time, I am confident that any local health department, even though it be a small one, can provide a number of books and current journals for its personnel which, if used in connection with their work, will be of immense value in a program of study. It seems to me that it would be legitimate to use the contingent fund of the budget within limitations for purchasing certain books or for subscribing to journals. These may be added to by special donations on the part of individuals in the community or local agencies such as federated and civic clubs and the local medical society.

There should be some method of encouraging systematic reading on the part of the health personnel. This depends a good deal on the health officer's interest and perspective in keeping his personnel interested and informed concerning modern public health. A program of reading could be adopted by the health officer, as well as by the nurse, the engineer, the inspector or other workers, and discussions could be stimulated bearing upon certain subjects in weekly or biweekly conferences. Such conferences would afford opportunity for the members of the health department to contribute to each others knowledge by interchange of ideas and by reporting new facts and methods in public health practice. This would be one way of avoiding the indictment of being a mere routine public health worker.

3. The personnel of State and local health departments should attend the annual conference of the State health department. Such conferences are now being held by all of the wide-awake State health organizations. They are proving of immense value in informing the different groups of health workers concerning the problems and difficulties encountered by one another. I have observed that following these meetings one frequently enters upon his task invigorated and with a new perspective, which indicates the unquestioned value of contacts of this kind.

4. It is also very desirable that health officers, engineers, nurses, inspectors, and others engaged in health work attend meetings from time to time which may be of national or sectional importance. For example, the health officer will profit greatly by attending as frequently as possible the annual meetings of the American Medical Association. Many papers are read in the section on preventive and industrial medicine and public health which are of much interest and practical importance in scientific public health. The meetings of the American Public Health Association afford splendid contacts, and the various sections provide opportunity for one to follow his interest in special phases of public health. This organization has sections on public health administration, engineering, child hygiene, statistics, and so forth. The large exhibit may also be observed and studied with profit. However, the greatest asset of these meetings is contact with other workers and, in conversation, finding out in a measure their problems and difficulties and the way in which they solve them. A large acquaintance in the field of public health is well worth while, and in attending such meetings one has the opportunity of knowing and cultivating others who are engaged in the same line of endeavor. This is stimulating and broadens one's educational and scientific horizon.

I should not forget to mention in this connection the meetings of the Southern Medical Association, which are particularly beneficial to those living in this part of the country. The section on hygiene and public health is always well attended. It provides an avenue for the reading and publication of papers on public health subjects with special reference to semitropical conditions. Being present at these meetings and hearing the discussions of such subjects creates a disposition to read the papers which are published monthly in the Journal of the Southern Medical Association. In affiliation with this meeting, there is the annual conference of the National Malaria Committee which provides a splendid program on malaria control. Papers which have been read at this meeting are published in the Southern Medical Journal, and anyone who is engaged in malaria work will find them most helpful in the control of malaria.

Of the greatest importance are the local medical society meetings and the annual meetings of the State medical association. Health officers should attend these meetings and become acquainted with physicians who occupy influential positions in the practice of medicine in their respective communities. All of this has a very definite bearing on the general promotion of public health. Such contacts are stimulating and afford opportunities for acquiring information in the different phases of medical service. I can scarcely see how any health officer can be as successful as he should be unless he keeps in close touch with the local and State medical societies. This is fundamental.

5. Every health worker should become interested in a special problem and should study it with a view to preparing a paper for some scientific meeting. The preparation of a paper necessitates working up the subject both from the standpoint of one's own experience and observations and the reading of literature which bears upon the problem. In this way one finds it necessary to read and study. This kind of effort tends to make a person more accurate, thoughtful, and conservative. It is an excellent way to build up knowledge of a subject. Moreover, there is much need for field studies in epidemiology, maternal mortality, and public-health administration.

6. One phase of public-health work to which I wish to refer is the making of talks or addresses at schools or before other public audiences. I am inclined to think that the average health officer does too much spontaneous talking, if I may use this term; that is, speaking to groups of people without any preparation or without giving much thought to what is to be said. It seems to me that this kind of educational work is not very productive. How much better it would be if one were to select a topic, read somewhat on the subject, and present in a concrete way certain items which are relevant and which will be productive of thought in the listeners.

7. One very important phase of study or reading is the history of preventive medicine and public health. Some years ago the American Public Health Association published a volume entitled "A Half Century of Public Health." This publication includes chapters on the history of different phases of public health service, such as bacteriology, the quarantine system in the United States, 50 years of water purification, milk and its relation to public health, food conservation, and child welfare work in the United States. This volume may be obtained from the American Public Health Association and is of much value for reference in any public health library. Then there is a volume recently published on Pioneers of Public Health, by Mrs. M. E. M. Walker, with a foreword by Sir Humphrey Rolleston, of Cambridge University. This is a most interesting volume and I think that any one will get inspiration and benefit from reading it. I may state that there is an interesting history in connection with the

writing of this book. The names of those who are discussed are on the façade of the London School of Hygiene and Tropical Medicine. Mrs. Walker, on observing these names on the façade of the building, became interested and decided to write a book on these distinguished physicians and scientists. She was encouraged to do so by Sir Andrew Balfour, who, after the manuscript had been finished, found it of such interest that it was decided to publish it in book form. I should also mention in this connection the book by Sir Arthur Newsholme on the Evolution of Preventive Medicine. Every public health worker should read this small volume. It adds greatly to the enthusiasm and inspirational qualities of a task if one has an appreciation and respect for the background of the field in which he is engaged. It seems to me that reading or study should be directed somewhat along the line of the background or the history of public health, so that one may gain new inspiration in meeting the difficult problems with which he is confronted. We should know something of the trials, sacrifices, and achievements of the pioneers of public health.

8. In conclusion, I wish to suggest that some plan should be worked out by each State so that the personnel of the local health departments can avail themselves of continued study in postgraduate courses in certain universities. Short intensive courses of this kind can be made most helpful and constructive in building up one's professional background. These courses are referred to in England as "refresher courses." Last year five health officers were brought in from as many counties in Tennessee and provision was made for them to take a two months' course provided by the department of preventive medicine and public health of Vanderbilt Medical School in cooperation with the Tennessee State Health Department. Substitutes were provided for these men so that their work continued under effective direction. It seems to me that this procedure is particularly desirable, and I know of no plan which would afford better opportunity for continued study on the part of health personnel than for a scheme to be worked out by the United States Public Health Service and State health departments in cooperation with educational institutions, possibly with the aid of philanthropic agencies, so that postgraduate instruction may be offered to health officers, nurses, and others who may be interested in gaining new knowledge and in keeping in the forefront of their profession.

APPENDIX

The accompanying list of books should be in the library of every State and local health department. It has been prepared with the assistance of Dr. Henry E. Meleney, associate professor, and Dr. A. E. Keller, assistant professor, in the department of preventive medicine and public health, Vanderbilt University School of Medicine.

GENERAL

Fitzgerald, J. G.: An Introduction to the Practice of Preventive Medicine. (2d edition.) 1926.
Hope, E. W., and Stallybrass, C. O.: Textbook of Public Health. (9th edition.) 1926.
Kenwood, H. R., and Kerr, H.: Hygiene and Public Health. (8th edition.) 1929.
Park, W. H.: Public Health and Hygiene. 1928.
Rosenau, M. J.: Preventive Medicine and Hygiene. (5th edition.) 1928.
Vaughan, V. C.: Epidemiology and Public Health. 2 vols. 1922.
Broadhurst, J.: Home and Community Hygiene. (4th edition.) 1929.
Dublin, L. I.: Health and Wealth. 1928.
Horwood, M. P.: Public Health Surveys. 1921.
Moore, H. H.: Public Health in the United States. 1923.
Smiley, D. F., and Gould, A. G.: Community Hygiene. 1929.
Cecil, R. L.: A Textbook of Medicine. 1927.
Osler, W., and McCrea, T.: The Principles and Practice of Medicine. (11th edition.) 1930.
Holt, L. E., and Howland, J.: Diseases of Infancy and Childhood. (9th edition.) 1926.
Stitt, E. R.: The Diagnostics and Treatment of Tropical Diseases. (5th edition.) 1929.
Williams, J. W.: Obstetrics. (6th edition.) 1930.

PUBLIC HEALTH ADMINISTRATION

American Child Health Association, Research Division: A Health Survey of Eighty-Six Cities. 1925.
American Public Health Association: Appraisal Forms, Rural and City.
Overton, F., and Denno, W. J.: The Health Officer. 1919.
Mustard, H. S.: A Cross Section of Rural Health. 1930.
McCombs, C. E.: City Health Administration. 1927.
Schmeckebier, L. F.: The Public Health Service, Its History, Activities, and Organization. Service Monograph of the United States Government, No. 10. Institute for Government Research. Johns Hopkins Press. 1923.
Leigh, R. D.: Federal Health Administration in the United States. 1927.

VITAL STATISTICS

Brinton, W. C.: Graphic Methods for Presenting Facts. 1923.
Chaddock, R. E.: Principles and Methods of Statistics. 1925.
Falk, I. S.: Principles of Vital Statistics. 1923.
Pearl, R.: Introduction to Medical Biometry and Statistics. (2d edition.) 1930.
Whipple, G. C.: Vital Statistics. 1922.
U. S. Census Bureau: Index to the International List of Causes of Death and Manual of Joint Causes of Death. (1930 revision.) 1931. Washington, D. C.: Government Printing Office.

EPIDEMIOLOGY

Bushnell, G. E.: The Epidemiology of Tuberculosis. 1920.
Hamer, W.: Epidemiology Old and New. 1929.
Stallybrass, C. O.: The Principles of Epidemiology and the Process of Infection. 1931.

COMMUNICABLE DISEASES

Bowers, A. G., and Pilant, E. B.: Communicable Diseases for Nurses and Mothers. 1929.
Chapin, C. V.: Sources and Modes of Infection. (2d edition.) 1912.
McLaughlin, A. G.: The Communicable Diseases. 1923.
Nichols, H. J.: Carriers in Infectious Diseases. 1922.
Rolleston, J. D.: Acute Infectious Diseases. (2d edition.) 1929.
Shamberg, J. F., and Kolmer, J. A.: Acute Infectious Diseases. 1928.
Stimson, P. M.: A Manual of the Common Contagious Diseases. 1931.
Medical Research Council, Bacteriological Committee: Diphtheria. 1923.
Gay, F. P.: Typhoid Fever. 1918.
Fishberg, M.: Tuberculosis. 1922.
Myers, J. A.: Modern Aspects of the Diagnosis, Classification, and Treatment of Tuberculosis. 1927.
Myers, J. A.: The Care of Tuberculosis. 1924.
Myers, J. A.: Tuberculosis Among Children. 1930.
Shamberg, J. F.: Diseases of the Skin and the Eruptive Fevers. 1921.
Stakle, J. H.: Dermatology and Syphilology for Nurses. 1930.
Stokes, J. H.: Modern Clinical Syphilology. 1928.
Sutton, R. L.: Diseases of Skin. 1928.

BACTERIOLOGY AND PARASITOLOGY

Jordon, E. C., and Falk, I. S.: The Newer Knowledge of Bacteriology and Immunology. 1928.
Park, W. H., and Williams, W. A.: Pathogenic Microorganisms. (9th edition.) 1929.
Zinsser, H.: A Textbook of Bacteriology. (6th edition.) 1928.
Stitt, E. R.: Practical Bacteriology, Blood Work and Animal Parasitology. (8th edition.) 1927.
Chandler, A. C.: Introduction to Human Parasitology. 1930.
Boyd, M. F.: An Introduction to Malariology. 1930.

NUTRITION AND FOOD

Blum, S.: Practical Dietetics for Adults and Children in Health and Disease. (3d edition.) 1928.
Eddy, W. H.: Nutrition. 1928.
Kelly, E., and Clements, C. E.: Market Milk. 1923.
Klein, L. A.: Principles and Practice of Milk Hygiene. 1917.
Lusk, G.: The Elements of the Science of Nutrition. (4th edition.) 1928.
McCollum, E. V., and Simonds, N.: The Newer Knowledge of Nutrition. (3d edition.) 1925.
McCollum, E. V., and Simonds, N.: Food, Nutrition, and Health. (2d edition.) 1929.
Parsons, T. R.: Fundamentals of Biochemistry in Relation to Human Physiology. (3d edition.) 1928.
Rose, M. S.: Feeding the Family. 1925.
Rose, M. S.: Foundations of Nutrition. 1929.
Sherman, H. C., and Smith, S. L.: The Vitamins. (2d edition.) 1931.
Stiles, P. G.: Nutritional Physiology. (5th edition.) 1924.
Thom, C., and Hunter A., C.: Hygienic Fundamentals of Food Handling. 1924.

MATERNAL, CHILD, AND SCHOOL HYGIENE

Van Blarcom, C.: Obstetrical Nursing. 1922.
Zabriskie, L.: Nurses' Handbook on Obstetrics. 1929.

Arlitt, A. H.: Psychology of Infancy and Early Childhood. 1928.
Baker, S. J.: Child Hygiene. 1925.
Brown, M. A.: Teaching Health in Fargo. 1929.
Clark, M. A.: Recording and Reporting For Child Guidance Clinics. 1930.
DeSchweinitz, P.: Growing Up. 1928.
Rand, W., Sweeny, M., and Vincent, E.: Growth and Development of the Young Child. 1930.
National Education Association and American Medical Association: Health Education—A Program for Public Schools and Teacher-Training Institutions. Report of the Joint Committee on Health Problems in Education. 1930.
Sellew, G.: Pediatric Nursing. 1926.
Terman, L. M., and Almack, J. C.: Hygiene of the School Child. 1929.
Thom, D. A.: Everyday Problems of the Everyday Child. 1927.
Wood, T. D., and Rowell, H. G.: Health Supervision and Medical Inspection of Schools. 1927.
Woodbury, R. M.: Infant Mortality and Its Causes. 1927.

INDUSTRIAL HYGIENE

Clark, W. I.: Health Service in Industry. 1922.
Hamilton, A.: Industrial Poisons in the United States. 1925.
Hope, E. W.: Industrial Hygiene and Medicine. 1923.
Kober, G. M., and Hayhurst, E. R.: Industrial Health. 1924.

MENTAL HYGIENE AND SOCIOLOGY

Burnham, W. H.: The Normal Mind. 1924.
Davies, S. P.: Social Control of the Mentally Defective. 1930.
Groves, E. R., and Blanchard, P.: Introduction to Mental Hygiene. 1930.
Porter, R. L., Kenworthy, M. E.: Mental Hygiene and Social Work. 1929.
Sayles, M. B.: The Problem Child at Home. 1928.
Tredgold, A. F.: Mental Deficiency. (4th edition.) 1922.
Wickman, E. K.: Children's Behavior and Teachers' Attitudes. 1928.
White, W. A.: An Introduction to the Study of the Mind. 1924.
Byington, M.: What Social Workers Should Know About Their Own Community. 1929.
Landis, B. V.: Handbook of Rural Social Resources. 1928.
Townsend, H.: Social Work, A Family Builder. 1926.

PUBLIC-HEALTH NURSING

Beard, M.: The Nurse in Public Health. 1929.
Brainard, A.: The Evolution of Public Health Nursing. 1922.
Brainard, A.: Organization of Public Health Nursing. 1919.
Burgess, M.: Nurses, Patients and Pocketbooks. 1928.
Dock, L., and Stewart, I.: Short History of Nursing. 1924.
Gardner, M. S.: Public Health Nursing. (2d edition.) 1927.
Hodgson, V.: Tuberculosis Nursing for Public Health Nurses. 1929.
National Organization Public Health Nursing: Manual of Public Health Nursing. 1928.
National Organization Public Health Nursing: Board Members Manual. 1930.
Pillsbury, E.: Nursing Care of Communicable Diseases. 1929.
Williams, J.: Personal Hygiene Applied. 1928.
Wright, F.: Industrial Nursing. 1928.

SANITARY ENGINEERING AND SANITATION

Ehlers, V. M., and Steel, E. W.: Municipal and Rural Sanitation. 1927.
Hardenbergh, W. A.: Home Sewage Disposal. 1924.

Kibbey, C. H.: The Principles of Sanitation. 1927.
Phelps, E. B.: The Principles of Public Health Engineering. 1925.
Winslow, C.-E. A.: Fresh Air and Ventilation. 1926.

LEGAL MEDICINE

Hemenway, H. B.: Legal Principles and Administration. 1914.
Tobey, J. A.: Public Health Law. 1926.
Peterson, F., Haines, W. S., and Webster, P. W.: Legal Medicine and Toxicology. 2 vols. (2d edition.) 1923.
Robertson, W. G. A.: Manual of Medical Jurisprudence and Toxicology. 1921.

HISTORICAL AND BIOGRAPHICAL

Gorgas, M. D., and Hendrick, B. J.: William Crawford Gorgas, His Life and Work. 1924.
Jordan, O. E., Whipple, G. C., and Winslow, C.-E. A.: Pioneer of Public Health—William Thompson Sedgwick. 1924.
Kelly, H. A.: Walter Reed and Yellow Fever. 1923.
Nash, R.: A Short Life of Florence Nightingale. 1925.
Newsholme, A.: The Evolution of Preventive Medicine. 1927.
Seelig, M. G.: Medicine—An Historical Outline. 1925.
Trudeau, E. L.: Autobiography. 1916.
Vallery-Radot, R.: Life of Pasteur. 1927.
Walker, M. E. M.: Pioneers of Public Health. 1930.
Winslow, C.-E. A.: The Life of Hermann M. Biggs, Physician and Statesman of Public Health. 1929.

MISCELLANEOUS

American Society for the Control of Cancer: Essential Facts About Cancer. 1924.
Barker, L. F., and Sprunt, T. P.: The Degenerative Diseases, Their Cause and Prevention. 1925.
Dorland, W. A. N.: The American Illustrated Medical Dictionary. (13th edition.) 1925.
Murrell, W.: What To Do in Cases of Poisoning. (13th edition.) 1926.
Pardee, H. E. B.: What You Should Know About Heart Disease. 1928.

THE CHEMISTRY OF CELL DIVISION

II. THE RELATION BETWEEN CELL GROWTH AND DIVISION IN AMOEBA PROTEUS

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INTRODUCTION

In the first of this series of papers, Voegtlin and Chalkley (1930) reported results obtained in respect to the action of glutathione on division in *Amoeba*. During the course of the investigation it became evident that more complete information upon the relations between cell growth, division, and polynucleation was desirable in order to

[1] The writer wishes to express his thanks to Dr. H. Kohler, biophysicist, National Institute of Health, for helpful suggestions and criticism of the mathematical treatment of the results.

provide a basis for the evaluation of further data that it is hoped may be secured in respect to the chemistry of cell division. This paper represents the results of an attempt to secure additional information on these matters. The investigation was based on the following considerations:

The individual organisms in a culture of *Amoeba proteus* vary widely in volume. They also vary as to the number of nuclei they contain. Stolc (1906) and Levy (1924) observed as many as six nuclei in a single cell. The latter observer asserts that cells with more than one nucleus are generally somewhat larger than those with single nuclei, and he maintains that these polynucleates result from failure of nuclear and cytoplasmic division to coincide. If Levy's findings are true, a close correlation should exist in *Amoeba* between the volume of the cell and the number of nuclei contained therein.

Voegtlin and Chalkley (loc. cit.) found that the percentage of cell division occurring in a given time in a group of mononucleate *Amoebae* is dependent, if the range of volume is narrow, upon the average volume for the group. This is also true for the number of polynucleate *Amoebae* found in the group at the end of a given period, indicating that nuclear division is also a function of volume. It was assumed that differences in volume in *Amoeba* are primarily growth differences, and that growth is an increasing function of time. If this be true, any cellular characteristic that changes with volume, *under the normal conditions of culture*, is likewise a function of time, and it should be a simple matter to ascertain the course of such changes with age by a statistical study of their relations to volume.

In view of these considerations, it appeared that if the relation between time and volume—i. e., the course of growth of *Amoeba*—was ascertained, it might be possible from a statistical study of *Amoebae* of different volumes to ascertain the relation of division of nucleus and of cytoplasm and the rate of growth to age and their relation to each other. This should furnish valuable information as to the normal intracellular conditions associated with cell division in this organism, which should assist in the planning of further experimental research on division and in providing criteria for the selection of more uniform material for any physiological and pharmacological experimentation on *Amoeba proteus*.

A statistical study on *Amoeba proteus* as cultured in this laboratory was therefore instituted to ascertain the relation of the volume of the cell to (*a*) time, (*b*) the nucleo-cytoplasmic ratio, (*c*) the number of nuclei in the cell, and (*d*) the distribution of individuals of different volumes and types of nucleation in a culture.

MATERIAL AND METHODS

Amoeba proteus (Sch., 1916) from a strain which was obtained originally from the Johns Hopkins University, and which has been

continuously cultured by a single procedure (Chalkley, 1930) for the past two years, was used throughout.

While some variation existed from culture to culture, it does not appear that it was sufficient to constitute a serious source of error,

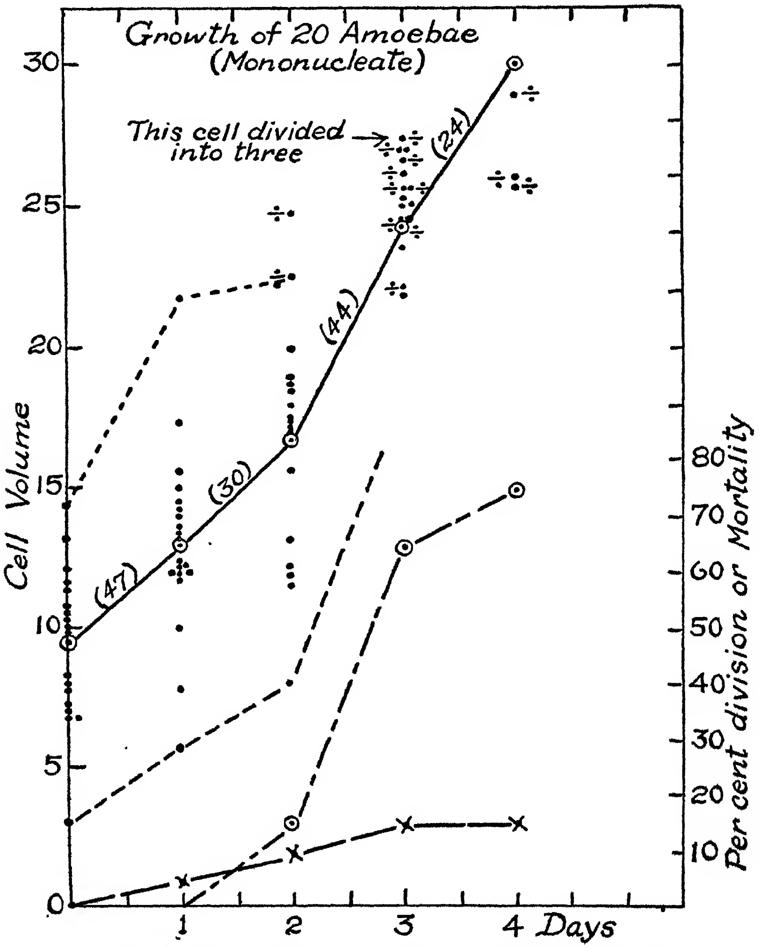

FIGURE 1.—Daily growth of 20 mononucleate *Amoebae*. Solid line represents average growth (increase in volume); fine broken lines, growth of largest and smallest *Amoebae*, heavy broken line, percentage mortality; dotted and dashed line, percentage division. Division signs opposite points indicate division of cells. Figures in parentheses give percentage growth rate on successive days

and in some sets of measurements, as will be pointed out later, this was tested.

The measurements of cell and nuclear volumes were made by means of a compound microscope, with an eyepiece micrometer, using a 20-X ocular and 16-mm. apochromatic objective when measuring

the cell, and a 20-X ocular and 4-mm. apochromatic objective when measuring the nucleus. In measuring cell volumes the *Amoebae* were repeatedly drawn into and ejected from a capillary pipette and thus stimulated until they assumed a spherical shape. Then their

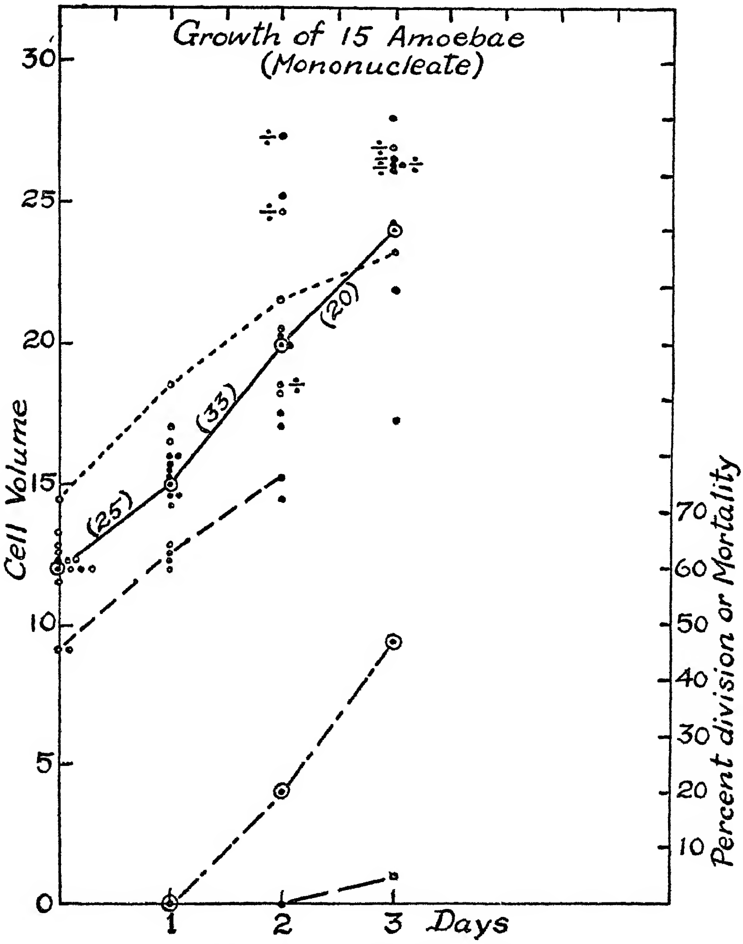

FIGURE 2.—Daily growth of 15 mononucleate *Amoebae* (daughter cells of those dividing in Figure 1). Solid line represents average growth (increase in volume); fine broken lines, growth of largest and smallest *Amoebae;* heavy broken line, percentage mortality; dotted and dashed line, percentage of division. Division signs opposite points indicate division of cells. Figures in parentheses give percentage growth rate on successive days

diameters were ascertained and their volumes calculated. The measurements thus secured proved sufficiently accurate, and it was fortunately not necessary to use the more precise but more time-consuming methods available (Chalkley, 1929).

In measuring nuclear volumes each nucleus was kept under observation until several measurements of its three dimensions had been secured. The shape of the nucleus varies from ellipsoid in most very small cells to discoid in the larger cells. Neglect of this change of

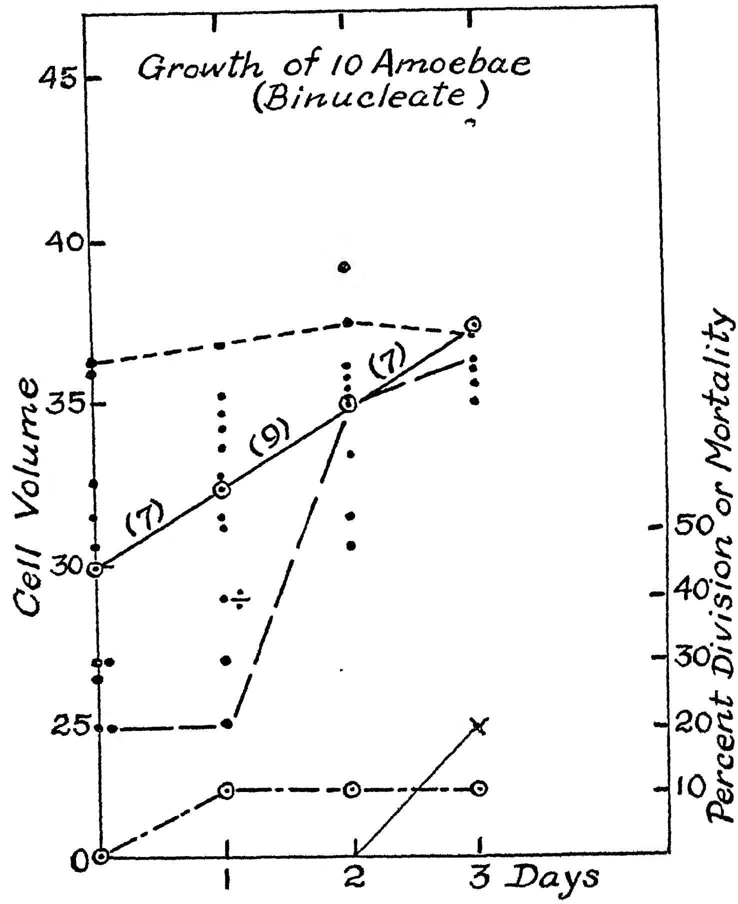

FIGURE 3.—Daily growth of 10 binucleate *Amoebae*. Solid line represents average growth (increase in volume); fine broken lines, growth of largest and smallest *Amoebae;* heavy broken lines, percentage mortality; dotted and dashed line, percentage division. Division signs opposite points indicate division of cells. Figures in parentheses give percentage growth rate on successive days

shape, however, appeared to constitute a negligible error in comparison with the error inherent in the technique of measurement of the dimensions, and so an approximation was made by considering it an ellipsoid and calculating the volume on that basis.

In this paper all measurements given in the text and figures are in arbitrary units. They can be converted to absolute volumes in

cubic millimeters by multiplying cytoplasmic or cell volumes by 0.000098 and nuclear volumes by 0.00000078.

CELL GROWTH IN AMOEBA

To obtain a representative growth curve for the cell, 20 small mononucleate *Amoebae* and 10 large binucleate *Amoebae* were selected. Their volumes were measured and then each was put into a 25-c.c. pyrex glass beaker containing 2 to 3 cubic centimeters of fluid from the culture from which the *Amoebae* were taken. Care was exercised to ensure an ample supply of food organisms in each beaker. Then the volume of each *Amoeba* was measured daily for three successive days. Divisions occurred in the group of 20 originally small *Amoebae* during the second, third, and fourth days of the experiment. The daughter cells as formed were also isolated and their volumes measured over a period of three days. Divisions occurred in this group on the second and third days. Only one division, and that on the *first* day, occurred in the group of 10 binucleate *Amoebae*. The original group of 20 small *Amoebae*, the group composed of their daughter cells, and the group of large binucleate *Amoebae* are hereafter referred to as Groups 1, 2, and 3, respectively. The measurements, including the sums of the volumes of the pairs of daughter cells the first day found were averaged each day for each group, and these averages were plotted as a function of time. The resulting curves, showing the average growth (increase in volume with time) in each of the three groups, are presented in Figures 1, 2, and 3. In these figures the daily measurements of each individual are plotted, as well as the averages, to enable the reader to form an idea of the variation encountered. This for the individual cells was of considerable magnitude. In addition, the individual growth curves of the smallest and largest cell in each group are indicated, as is also the percentage of division and mortality, and the average daily percentage rate of growth.

From these figures it is seen that the volume of the cell is in fact an increasing function of time, so that cell characteristics which are functions of the volume may properly be compared as functions of age, provided, of course, that *averages* and not *individuals* are dealt with.

Attention is drawn to the close grouping both as to volume and age of the cells in Groups 1 and 2 that divided. The average volume at which division occurred in Group 1 is 25.0. The modal[2] volume is between 25 and 30, and the range 18.6 to 29.0 with an average deviation of 1.8.

[2] The mode is, of course, the *most frequent* in a series of measurements. The modal class (in this case the class of volumes between 25 and 30) is the class in which the greatest number of observations fall.

In Group 2 the average volume is 25.3, the mode is between 25 and 30, the range from 18.5 to 27.4, and the average deviation 2.1.

If we consider, as seems most reasonable in view of the range of original volumes in Group 2 in which all cells were known to be less than 24 hours old, that the cells in Group 1 were of similar age when selected, it appears that of the 22 cells that divided (Groups 1 and 2) 5, or 23 per cent, with an average volume of 23.5, divided on the second day; 14, or 64 per cent, with an average volume of 25.4 on the third day, and 3, or 23 per cent, with an average volume of 26.9 on the fourth day. This gives an average period from division to division of 2.9 days. From Figure 3 it will be noted that in the group of large binucleates, whose average volume at the beginning of the experiment was 29.9 (just the average reached by Group 1 at the end of the experiment), there was only one cell division, and this on the first day. This may indicate that with increase in cell volume above the mode of 25–30 found for Groups 1 and 2, and the occurrence of nuclear division, the tendency toward cytoplasmic division is decreased even though the presence of two nuclei within the cell might *a priori* be expected to increase rather than decrease such a tendency. In addition it is noticeable that the mortality tends to increase with age and volume. This is shown by comparison of the mortality in Group 3 with that in Groups 1 and 2. This confirms the conclusion of Levy (loc. cit.). These figures as a whole show very definitely that in *Amoeba* the volume of the cell is normally (i. e., under cultural conditions) an increasing function of time. So, using the term *age* in a general sense as referring to the state of development of the cell within the growth cycle from cell division to cell division, it may be said that cells in the average grow steadily larger with age. If the polynucleates measured are typical of the very large cells, they suggest that the rate of cell growth may be a decreasing function of time and volume.

There are other facts, however, of considerable interest. It will be noted that one cell in Group 1 (see fig. 1) divided into three. While it must be admitted that this division was not actually observed, it appears, in view of other data given later, more probable that this cell divided thus directly than that the three small cells found were the result of two rapidly succeeding divisions. The cells, however, were of such a size (8.5, 8.4, and 10.4 in volume, respectively) that this might have been the mechanism of production. In either event such a division indicates the method of production of the very small cells (having volumes as low as 2.0) that occasionally appear in the cultures.

It was very noticeable that *Amoebae* undergo a striking change in appearance with division. Just prior to division the cytoplasm is quite granular and frequently has a slight dusky yellowish tinge in the nongranular portions. The streaming of the cytoplasm appears somewhat sluggish. The nucleus differs strongly from the cytoplasm in

refractive index, and the chromatin blocks at its periphery are easily distinguished. The nuclear surface appears coarsely granular. The periphery of the nucleus is often slightly irregular and its shape is discoid (occasionally bent, irregular). Just after division the cytoplasm is more hyaline, less granular, and the streaming active. The cell reacts very promptly to mechanical stimuli and adheres very strongly to the substrate. The nucleus apparently differs little from the cytoplasm in refractive index and is often hard to find. The chromatin blocks are usually invisible and the nuclear surface shows none or extremely fine granulation. The periphery of the nucleus is smooth and its shape usually ovoid, occasionally slightly discoid. The picture presented in this change is one of rejuvenation accompanied by an increased dispersal of the cell colloids.

Figure 4 shows the growth curve of a hexanucleate *Amoeba*. It is interesting to note that the greatest growth increment per 24 hours observed in this cell was only slightly in excess of the average growth increment in Group 1 and much less than the increment of the smallest cell in that group during the third day. The percentage rate of growth was very much less in this large cell than in the mononucleates. It would have been desirable to secure more of these giant cells, but none were available.

THE RELATION BETWEEN CELL VOLUME AND THE RATE OF GROWTH

In the preceding section it is noted that the rate of growth of the cell is apparently a function of time. Since, on an average, volume is a function of time, the plotting of the rate of cell growth as a function of volume should bring this out clearly.

From the preceding data it is a simple matter to ascertain the average per cent increase in volume per 24 hours as a function of volume. To do this all measurements of cell volume, together with their corresponding measurements after 24 hours, were recorded in order of magnitude of the initial measurement. A frequency table was then constructed for the initial measurements with an interval of 5, and the difference between the averages of the two sets of measurements for each interval, expressed as a percentage of the average of the initial measurements, was calculated. The mean deviation of the percentage rates of growth at all intervals of volume, except those which contained only one *Amoeba* (see fig. 5), was less than 10 per cent. These values were then plotted as a function of volume, taking each to correspond with the mean of the corresponding frequency interval. The curve obtained is presented in Figure 5. From this it will be seen that *the percentage rate of growth is a decreasing function of the cell volume* and tends to become constant at about a volume of 35–40. Consid-

ering this in terms of age, it indicates that *the rate of cell growth is greatest just after division and progressively lessens as the cell ages* until the time when cell division usually occurs. In cells that live longer the rate becomes approximately constant.

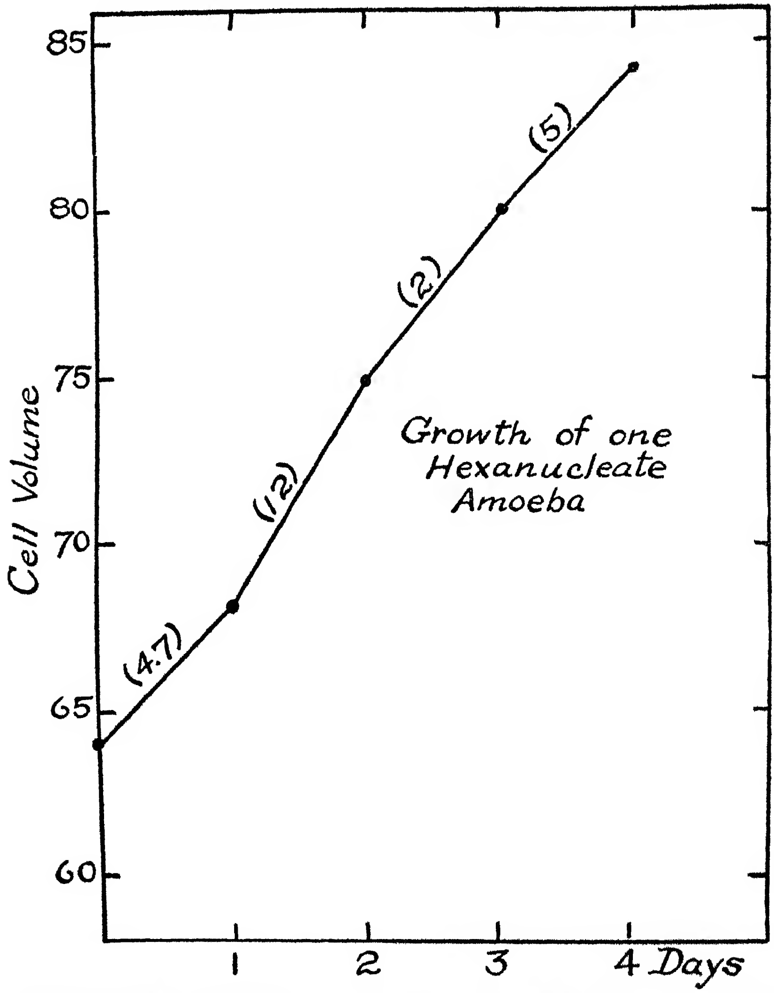

FIGURE 4.—Daily growth (increase in volume) of one hexanucleate *Amoeba*. Figures in parentheses represent growth on successive days

THE RELATION BETWEEN CELL VOLUME AND THE NUCLEO-CYTOPLASMIC RATIO

The volumetric ratio of cytoplasm to nucleus has long been known to change during the cycle from division to division in many cells, and this change has been linked with cell division. (Hertwig, 1903; Minot, 1895.) While many of the contentions of these investigators

undoubtedly can not be sustained, the changes in this ratio are of interest in that they are measurable intracellular growth changes, and it is only by the correlation of such changes with environmental changes that the problems of cell division and cell growth can be attacked. Further, all such changes that can be quantitatively correlated with volume may serve as criteria in the selection of material. It was therefore decided to make a study of this ratio.

To ascertain this, 80 *Amoebae* were selected and the volumes of nuclei and cells measured. Care was taken to get an even distribution over a wide range of cell volumes. Sixty of the *Amoebae* were taken from one culture and the other 20 from three other cultures. Measurements obtained from these conformed to those obtained from the

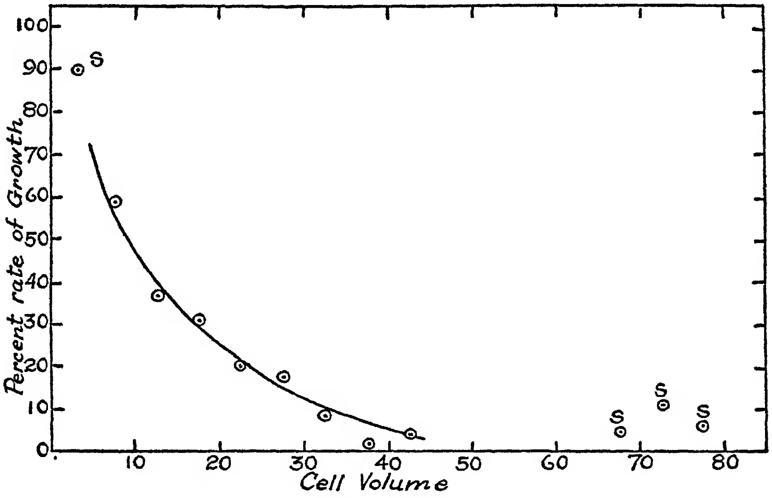

FIGURE 5.—Mean percentage rate of cell growth (increase in volume) for *Amoebae* of different cell volumes, based on 333 measurements on 46 *Amoebae*. Points marked "S" were obtained from measurements on only one *Amoeba*

single culture, indicating that the cultural variation encountered does not constitute a serious source of error in these measurements. From these measurements the volumetric ratio of cytoplasm to nucleus was calculated for each *Amoeba* and plotted as a function of cell volume. The resulting curve, smoothed by fives, is presented in Figure 6.

From the figure it is apparent that *with increasing volume the ratio of cytoplasm to nucleus increases;* i. e., it is an increasing function of volume, and therefore of the age (in a general sense) of the cell. Further, the flattening of the curve as the cell volume increases appears to indicate that the ratio tends to become constant in cells with a volume of over 50.

The curve obtained appeared so nearly inverse to that obtained for the rate of growth as a function of volume that it appeared of interest

to plot the rate of growth as a function of the nucleo-cytoplasmic ratio by interpolation of values for volume in Figures 5 and 6. The resulting curve is shown in Figure 7. This curve indicates very clearly that *the rate of growth is nearly inversely proportional to the nucleo-cytoplasmic ratio over a very wide range of volume.* It is interesting to

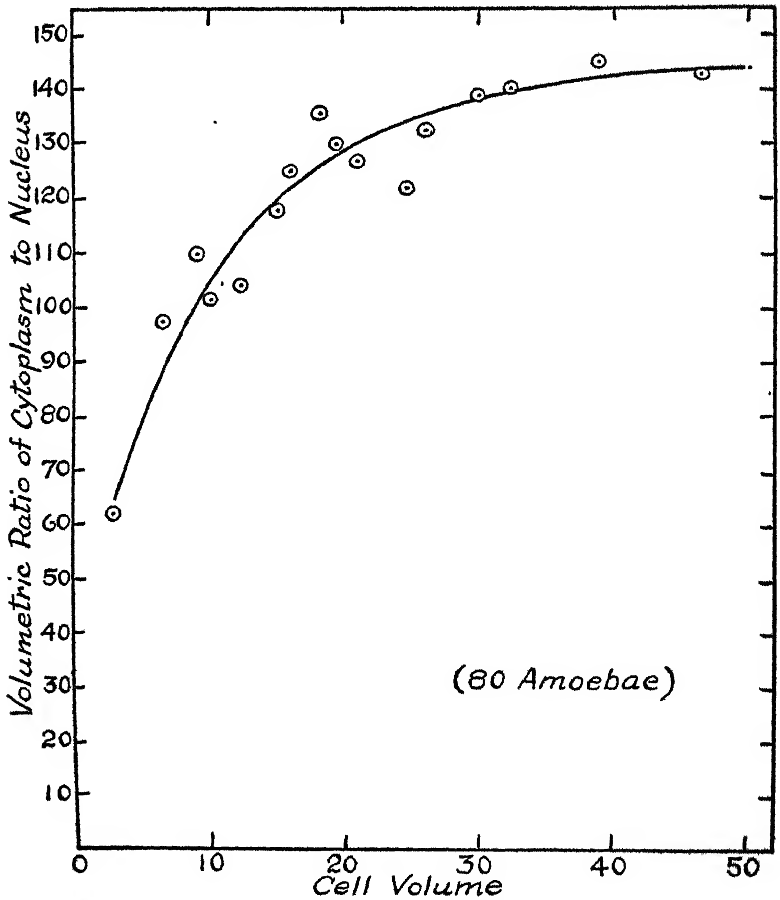

FIGURE 6.—Relation between cell volume and the volumetric ratio of cytoplasm to nucleus, based on measurements of cytoplasm and nuclei of 80 *Amoebae* of different volumes. Each point is an average of the measurements on five *Amoebae*

note that the departure from this relation first becomes marked at the point where the ratio of cytoplasm to nucleus reaches a value of 125–130 to one and the growth rate has decreased to about 30 to 25 per cent per 24 hours. This, it will be noted, occurs when the volume has increased to about 20, which is approximately the average volume attained by the *Amoebae* in Groups 1 and 2 (figs. 1 and 2) on the second day, at which time division first occurred.

THE RELATION BETWEEN CELL VOLUME AND THE NUMBER OF NUCLEI

In the section on cell growth it is suggested that there is a tendency toward suppression of cytoplasmic division in cells that attain a volume in excess of the apparent mode for cell division (25–30); i. e., that such cells tend to become polynucleate. By the time that the data on the nucleo-cytoplasmic ratio had been gathered it had become evident that cells in excess of this volume were nearly all polynucleate. Therefore the attempt was made to define the relationship more precisely. To do this the volumes of 284 *Amoebae* (from several

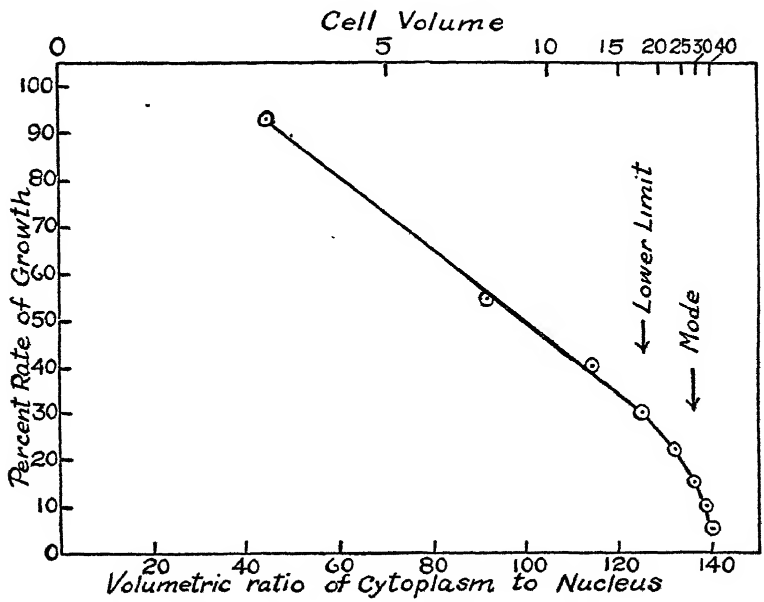

FIGURE 7.—Relation between percentage rate of cell growth and ratio of cytoplasm to nucleus, based on data given in Figures 5 and 6. The arrows indicate the approximate mode and lower limit, respectively, for cell division in the originally mononucleate cell

cultures) were measured and the number of nuclei in each cell was counted. The measurements of volume were then grouped in a frequency table using an interval of 5, and the percentage of each type of nucleation (i. e., mono, bi, tri nucleate, etc.) found in each interval was calculated. These percentages for each type were plotted as a function of cell volume. The resulting curves are presented in Figure 8.

From the figure it will be seen that the *different types of nucleation appear in regular order as the volume of the cells examined is increased,* and that each type successively increases in percentage frequency until it reaches or approaches a maximum, with the exception of the mononucleates, which, of course, are originally at their maximum.

The volume classes of the maximal percentages of the types are of considerable interest. If a glance is given to Figures 1 and 2 it will be noted that the modal volume found for division lies between 25 and 30. The maximum for the percentage of binucleates also is at this point, which must be the case if Levy's contention is true that the formation of polynucleates is due to failure of the cytoplasm to divide.

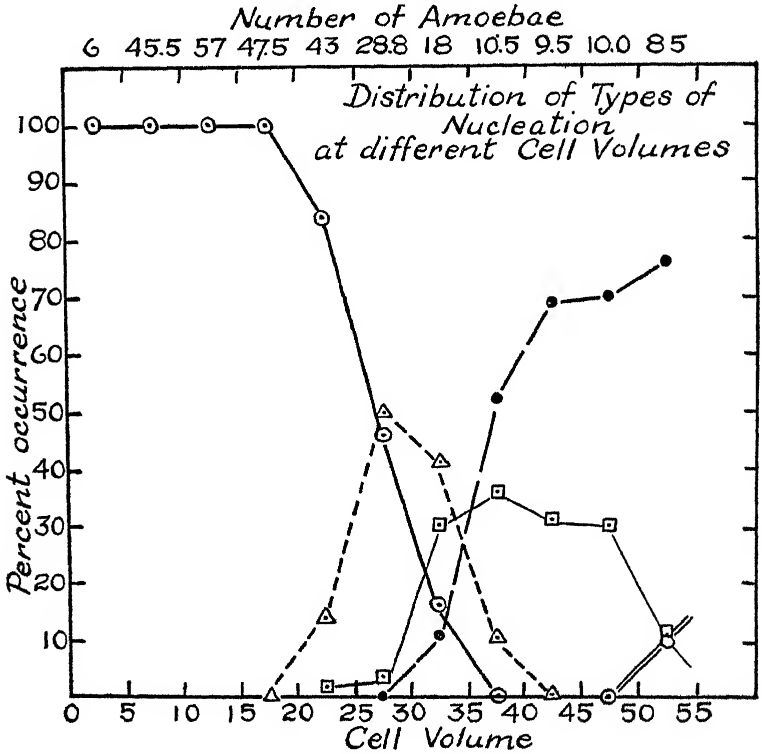

FIGURE 8.—Percentage distribution of *Amoebae* of different types of nucleation at different cell volumes. Heavy continuous line represents mononucleates; fine broken line, binucleates; fine continuous line, trinucleates; heavy broken line, quadrinucleates; double fine line, pentanucleates

Now, one-half of the modal volume at which cell division ~~is~~ most frequent is necessarily approximately the modal volume of the mononucleate cell just after division and (see fig. 9) very close to the modal volume for the mononucleate cell. Further, it will be noted that at the volume where the binucleates reach their maximum the percentage of tri and quadri nucleates begins to rise rapidly. Hence, if this is evidence of a systematic change, it is to be expected that the incidence of the pentanucleates at a volume of 50–55 is indicative that at about this volume the percentage of quadrinucleates will be

maximal. Taking, then, the mean (52.5) of the class 50–55 as the probable value for the modal volume of the quadrinucleates, and the modal volumes for the bi and tri nucleates as indicated on the curves,

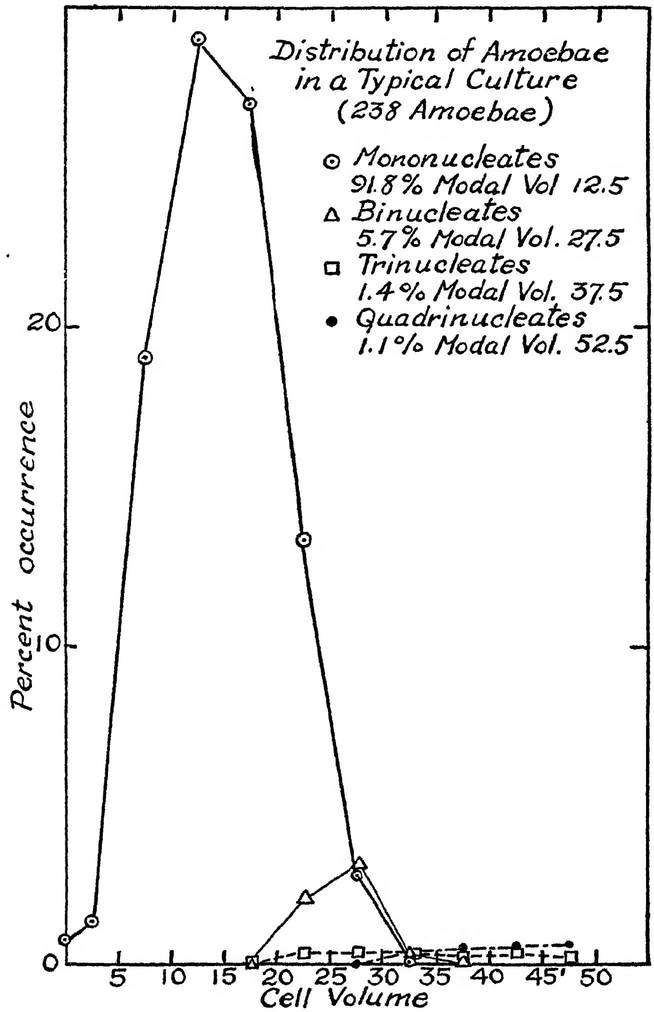

FIGURE 9.—Percentage distribution of *Amoebae* in a typical culture, with respect to volume and nucleation. The area under each curve is proportional to frequency of occurrence of the nuclear type in the culture. The individual curves show the percentage distribution of volume in respect to the entire culture for each type of nucleation up to the quadrinucleate

it will be seen that they are very nearly multiples of the modal volume of the mononucleate, as represented by one-half the modal volume at cell division; that is, *the modal volume for each type of polynucleate is*

very nearly the modal volume of the mononucleate multiplied by the number of nuclei. This is shown by the following table:

	Calculated modal volume	Observed modal volume
Binucleates	27.5	27.5
Trinucleates	41.2	37.5
Quadrinucleates	55.0	52.5

Thus it appears that the relations between the volumes at which the maximal occurrences of the several types of polynucleates are found may indicate that all types of nucleation in *Amoeba* are most stable when each nucleus has associated with it a definite volume of cytoplasm. The total volume of the nuclei in these large cells is so insignificant in respect to the cell as a whole that the cell volume may be taken instead of the cytoplasmic volume without introducing an error greater than errors of the modes.

This close relation certainly appears to indicate that the *division of the nucleus is a function of the total volume of the cytoplasm.* In no other way does it appear possible to account for the fact that increase in the number of nuclei in the cell is accompanied, on an average, by a directly proportional increase in cytoplasmic volume. This is particularly evident when due weight is given to the fact that when the number of nuclei is odd their volumes are so related that it is evident that the sum of the volumes of two of them is approximately equal to the volume of any one of the other nuclei in the cell. This condition could scarcely obtain if the polynucleates were formed to any extent by fusion of cells.

It is concluded, therefore, that Levy's contention as to the formation of the polynucleates is confirmed, and, further, that the division of the nucleus tends to be repeated as successive unit increments of cytoplasm are added. It would seem that this again indicates a tendency toward suppression of cytoplasmic division in very large cells.

THE FREQUENCY OF OCCURRENCE IN A CULTURE OF AMOEBAE OF DIFFERENT VOLUMES AND TYPES OF NUCLEATION

From data presented in the preceding section it is concluded that the binucleate *Amoebae* arise as individuals in which for some reason the cytoplasmic division that *usually occurs very soon after nuclear division,* at the time when the cell has attained a volume between 25–30, is suppressed and that continued suppression results in the formation of tri, quadri, etc., nucleated cells. Further, there are, as before noted, indications that a tendency to this suppression may be

accentuated with continued nuclear division and increase in cell volume. It seems probable, therefore, that if the percentage distribution of *Amoebae* in a culture as a function of volume is ascertained, it might be possible, by noting the relation of the percentages of cells which are (on the basis of the data in the preceding section) to be considered as mononucleate, binucleate, etc., to adduce further evidence as to whether cytoplasmic division did in fact, under the cultural conditions obtaining, tend to be suppressed as the number of nuclei within the cell increased.

To ascertain the distribution of the *Amoebae* of different volumes and types of nucleation in culture, some 200 *Amoebae* were taken at random from a culture and their volumes measured. A frequency table for volumes was then constructed as before, and the number in each interval as a percentage of the total number plotted as a function of volume. Then, using the data given in Figure 8, the percentage of each type of polynucleate in each interval was calculated and indicated in Figure 9. From this it will be seen that as the sum of the areas under the curves represents the total culture, approximately 91.8 per cent of *Amoebae* in the culture are mononucleate, 5.7 per cent are binucleate, 1.4 per cent trinucleate, and 1. 1 per cent quadrinucleate or more. At first glance the numerical relations would seem to constitute almost conclusive proof that with progressive increase in volume and nucleation the tendency toward cytoplasmic division declines, if it is granted, which to the writer appears most certain, that the polynucleates arise by repeated division of the nucleus. It must be considered, however, that, owing to their slower rate of growth, these polynucleated cells remain in each stage of nucleation longer than in the preceding one, at least to the trinucleate condition, and allowance must be made for this.

On an average, the cell persists as a mononucleate for approximately three days, as noted in the section on cell growth. Now, from the data for the rate of growth given in Figure 5, and the data for the occurrence of polynucleates in Figure 8, it is possible to calculate, approximately, the average length of time that the cell will persist on the average in the bi and tri nucleate condition. It will be noted from Figure 8 that the maximal number of cells are binucleate at a volume of about 27.5 and trinucleate at 37.5, quadrinucleate at 52.5. If we assume that the average cell just after division is half the volume of the cell at division (i. e., approximately 13.7), it is possible to calculate by the use of Figure 5 the time necessary for such a cell to grow to these sizes. If this is done, it appears that the average cell lives as a mononucleate 3 days, as a binucleate 3.5 days, and as a trinucleate 9 days. The mortality of cells in these conditions tends, as shown by the data in this paper and the work of Levy

(loc. cit.), to increase with increase in nuclear number; hence this would tend, if anything, to offset the effect of the longer periods of persistence with increasing nucleation. This, however, is neglected in what follows, as the data of Levy are not precise enough, and those here are insufficient to allow of quantitative expression.

If the tendency toward cytoplasmic division were constant in all types, it would be expected that the ratio of occurrence of the trinucleates at any one time, such as that depicted in the curve presented in Figure 9, would be the same in respect to the binucleates as is that of the binucleates to the mononucleates multiplied by the ratios of the times of persistence. This would mean that it would be expected that for each 100 mononucleates, 6.2 binucleates and 0.95 trinucleates would be found, whereas it appears that for each 100 mononucleates there are 6.2 binucleates and 1.5 trinucleates, or 57 per cent more trinucleates than the expected number. Neglecting the indicated increase in mortality in the polynucleate forms, which Levy's figures would indicate is of considerable importance, it would seem, then, that there is an indication that the tendency toward cytoplasmic division may be inhibited. Further research will be necessary however, to disprove or confirm this, especially as the possible methods of division of the polynucleates are diverse. This possibility is illustrated by the *Amoeba* (see fig. 1) which divided directly into three mononucleates without giving rise to a long-lived binucleate. That such divisions are of some frequency is probably indicated by the occurrence (see fig. 8) of a low percentage of trinucleate individuals with volumes approximating those of the average binucleate.

DISCUSSION

The results obtained must, of course, be understood merely as indicative of the most usual course of events in the growth of the cell in *Amoeba* under the cultural conditions used. This understood, they indicate strongly that the following is true: The average cell just after division has a volume of 10 to 15 and a ratio of cytoplasm to nucleus of approximately 125 to 1; its cytoplasm is hyaline with few granules; its nucleus is either ovoid or slightly discoid, with a refractive index very close to that of the cytoplasm, and is smooth and even of surface. Cell growth progresses at first at a relatively high rate, and as it proceeds the ratio of cytoplasm to nucleus increases. The rate of both growth and the relative volumetric increase of cytoplasm to nucleus diminishes as the cell volume increases with growth and the percentage rate of increase in volume is very nearly directly proportional to the decrease in the ratio of cytoplasm to nucleus until a volume of about 20 is attained.

This volume, 18 to 20, appears to be the usual lower limit for cell division. The majority of cells, however, divide when the volume

is between 25 and 30. In the *Amoebae* examined, the average time taken to attain this volume and divide was three days.

As the cell grows the cytoplasm apparently becomes more granular and its streaming more sluggish, and the nucleus becomes more granular, definitely discoid, usually biconcave, and of a higher refractive index and loses its smoothness of outline. In nuclei of cells judged to be near division there are often seen clefts or deep indentations. In certain cells (apparently these form some 8 per cent of the cells in the cultures in this laboratory) nuclear division takes place without the usual accompanying cytoplasmic division, with the result that the cell becomes binucleate. This occurs most frequently at the time the average cell has attained a volume between 25 and 30. Some cells of this type divide, but some continue to grow without dividing, some die and disintegrate, those that do neither become in a similar way trinucleate, and if again neither cytoplasmic division nor death occurs, may become quadrinucleate, pentanucleate, etc. This group of cells, the polynucleates, have, on the average, certain characteristics in common. The volumetric ratio of cytoplasm to nucleus is nearly constant, with a value of approximately 140 to 1. The number of nuclei tends to be directly proportional to the volume of the cytoplasm, the unit volume per nucleus being usually very close to the modal cytoplasmic volume of the mononucleate cell. The percentage rate of cell growth is low and approximately constant. The mortality rate tends to increase, probably rapidly, with the degree of polynucleation. However, these cells are, as individuals, extremely long lived. In comparison with the three days that the average mononucleate persists as an individual cell, the average quadrinucleate has lived and grown for approximately nine days before attaining the quadrinucleate condition.

It appears that these results indicate with regard to cell growth and division that the rate of growth is a very close correlate of the volumetric ratio of cytoplasm to nucleus, as is shown in Figure 7, and that, normally, *division of the nucleus is dependent upon the volume of the cytoplasm*, as is seen in Figure 8.

As to the *division of the cytoplasm* it seems to the writer that the results indicate that this *probably depends upon the volumetric ratio between cytoplasm and nucleus*. As mentioned previously, it normally occurs when the relation between the rate of growth and this ratio ceases to be direct, and there are indications that as this ratio and the rate of growth tend toward constant values the chances for cytoplasmic division become less. Certainly these results point to a marked independence between the mechanisms of nuclear and cytoplasmic division.

As regards the furnishing of criteria for the selection of material it appears that cells selected with regard to volume, nuclear number,

and the nucleo-cytoplasmic ratio together should, if the cells are taken from similar cultures, constitute very uniform material for research. Of the three criteria, volume would appear to be the most reliable single index.

SUMMARY

1. Measurements were made of the growth of single cells of *Amoeba proteus*. Measurements were also made on cells of *Amoeba proteus* over a wide range of cell volume, of the rate of growth, volumetric ratio of cytoplasm and nucleus, and the number of nuclei.

2. Under the cultural conditions used—

(*a*) The volume of *Amoeba* is an increasing function of time.

(*b*) The percentage rate of growth is a decreasing function of time.

(*c*) The volumetric ratio of cytoplasm to nucleus is an increasing function of cell volume.

(*d*) The rate of cell growth is inversely proportional to the volumetric ratio between cytoplasm and nucleus until a cell volume of approximately 0.0025 to 0.0030 cubic millimeter is attained. With greater increase in volume the ratio and rate of growth tend to become constant.

(*e*) The number of nuclei in the average cell is a function of the cell volume. The modal volume of polynucleates with a given number of nuclei is approximately equal to the modal volume of the mononucleates multiplied by the number of nuclei.

(*f*) Cytoplasmic division probably depends upon the volumetric ratio between cytoplasm and nucleus.

(*g*) Nuclear division probably depends upon the volume of the cell.

3. In *Amoebae* used for experimental material, consideration should be given not only to cultural conditions but also to the volume, nucleo-cytoplasmic ratio, and nucleation of the individuals, in order to secure greater uniformity of results.

REFERENCES

Chalkley, H. W.: Physiological Zoöl. (1929), **2**, 535.
———— Science (1930), **71**, 441.
Hertwig, R.: Biol. Centralbl. (1903), **23**, 49 and 108.
Levy, Joseph: Genetics (1924), **9**, 124.
Minot, C. S.: Biol. Centralbl. (1895), **15**, 161.
Stolc, Antonin: Arch. f. ent. Mech. der Organ (1906), **21**, 111.
Voegtlin, Carl, and Chalkley, H. W.: Pub. Health Rep. (1930), **45**, 3041.

THE AIR JET HYDROCYANIC ACID SPRAYER

By C. L. Williams, *Surgeon, United States Public Health Service*

The past 20 years has seen both a tremendous increase in the use of fumigation for the destruction of vermin on ships and great improvements in fumigation methods. In both cases the advances are due to the introduction of hydrocyanic acid as a fumigant.

Leaving the cumbersome, laborious, and time-consuming sulphur fumigation, we have passed through the method of generating HCN, with its still cumbersome apparatus and paraphernalia, through the period of liquid HCN, complicated by the difficulty of transporting so dangerous a material, and have arrived at the exceedingly simple procedure of knocking a hole in a can of Zyklon, pouring the contents down the hold, and throwing the can overboard.

Unfortunately the search for simplification has turned our attention away from the main purpose of fumigation, the destruction of vermin. This has been a rather natural deviation. The reputation established for HCN as a fumigant has been so great that one is naturally inclined to believe that the mere introduction of it into a closed compartment is quite sufficient to insure the death of all animal life therein. It is only after several years of study that we have been reluctantly forced to conclude that the mere liberation of the gas is not always enough, that to secure results we must take positive steps to assure penetration into the deeper recesses wherein the vermin which we seek to destroy take refuge.

It was reluctantly, and only after considerable experimentation, that the writer turned from Zyklon back to liquid HCN for the fumigation of vessels which are either loaded with cargo or have protected rat harborages which are heavily infested. The greater flexibility of the liquid form has permitted its adaptation to use with special apparatus far more effectively than has, as yet, been accomplished with Zyklon. It is usually considered an apparent reactionary move to retreat from the simple to the more complicated; but the method herein described effects such a superior fumigation that the greater difficulty attendant upon its use is more than justified under these conditions. It is not intended to discard the use of Zyklon, but to confine its use to the routine fumigation of the average ship which does not require special apparatus for effective fumigation and to smaller quarantine stations which could not use this more or less elaborate apparatus requiring compressed air and personnel experienced in the use of such apparatus.

PENETRATION

Those who have studied records of ship fumigation have been struck by the persistent recurrence of rats on some ships, sometimes over

periods of years, despite the facts that many ships are free from rats and that the great majority of vessels at least have intervals of freedom from these animals. Such a condition must have but one meaning—that is, that on the persistently infested vessels fumigation is relatively ineffective, some rats always escaping. The writer, after extensive observation, is able to assign but one cause to this condition—the failure of the fumigating gases to penetrate into the deeper rat harborages.

Penetration of fumigating gases into rat harborages is, to a considerable extent, dependent upon the concentration of the fumigant outside the harborages. Since rat harborages are almost always around the walls of infested inclosures, it is the concentration at the wall that is most important.

When the holds of a ship are fumigated with Zyklon or other fumigant introduced in solid form from which the HCN evaporates, it will generally be found that the highest concentration occurs in the hatchway, near the bottom of the hold. Unless the Zyklon has been scattered on the "'tween decks," the concentration in the far corners of all levels is likely to be considerably less than that in the hatchway. Furthermore, with Zyklon and similar materials the evaporation of the gas requires time, so that maximum concentration is not secured until some time after introduction of the fumigant. If there is any material loss of gas during the fumigation, the calculated concentration will never be reached.

By taking samples of air at various locations in ships' holds during fumigation and testing these for HCN concentration it has been shown at the New York quarantine station that the conditions mentioned above are those that actually occur during the usual fumigation of ships with Zyklon or HCN discoids. It is true that such conditions can be, to a large extent, overcome by scattering the fumigant in all directions on all decks; but this means that fumigators must go down into the holds to do the scattering, a procedure that they are not at all prone to carry out.

Liquid HCN delivered through the usual type of spray nozzle is spread to a greater extent than is the gas evaporating from Zyklon, yet this diffusion is not nearly so rapid or complete as with the apparatus described herein.

THE AIR JET HCN SPRAYER

The air jet sprayer for liquid HCN is an adaptation of the ordinary oxyacetylene blowpipe, the HCN being connected with the acetylene side and compressed air to the oxygen side. The apparatus works well over a considerable range of pressures, but is most effective when the HCN is supplied under a pressure of 75 to 100 pounds and the air from 100 to 200 pounds.

The method of use is not complicated. To the sprayer are attached two 50-foot lengths of rubber pressure tubing, one for air and one for HCN. The HCN tube is connected to a cylinder, called an applicator, containing liquid HCN under 75 to 100 pounds pressure. The air line is connected to an applicator filled with air at a pressure of 200 pounds. The air line is connected to the air side of its applicator; if connected to the gas side, condensed water in the bottom of the applicator will be taken up and will freeze in the nozzle of the sprayer, blocking it.

The sprayer is lowered into the hold below the lowest "'tween deck" and the air valve is opened. As soon as the noise of escaping air is heard, the gas valve is opened. When the liquid HCN reaches the nozzle, it is shot out in a fine white cloud to a visible distance of about 8 feet. Since the nozzle of the sprayer is at right angles to the hose line, the spray is projected toward the side of the hold. The recoil of escaping air causes the nozzle to fly about in various directions which can be controlled, to some extent, by twisting the supply lines, so that the spray is directed to all sides.

When the proper amount of gas for the lower portion of the hold has been delivered, the spray nozzle is drawn up to the level of each "'tween deck" in turn, where the amount of gas indicated for each level is delivered. When the full dose has been discharged, the gas valve is closed and the air permitted to run until the spray is no longer visible, when the air is cut off and the apparatus is drawn up and carried to the next hold. When all compartments have been fumigated the gas line is cleared by blowing air through it. Proper dosage is measured by keeping the gas applicator on a platform spring scale and noting the progressive loss of weight.

If a 30-pound applicator is used for the air tank, it will, starting at 200 pounds pressure and permitting it to drop to 75 pounds, spray approximately 3 pounds of liquid, when it must be refilled with air. Its operation, however, can be made continuous by connecting the line from the main air supply to the gas connection of the air tank and manipulating valves so as to maintain a pressure between 100 and 200 pounds. An air tank may be dispensed with entirely by placing a reducing valve in the main air line and connecting it directly to the air line of the sprayer.

The mistlike spray delivered by this apparatus is partly HCN in gaseous form, partly very fine droplets of liquid HCN which evaporate in the air of the hold immediately, and partly very fine particles of frozen HCN. These latter are so fine that apparently they are melted and evaporated before they settle to the bottom.

With this apparatus so little of the gas escapes up the hatchway that it is quite rare for fumigators handling the supply lines to require

the protection of gas masks. As a rule, the tarpaulin over the hatch may be rolled back for 2 or 3 feet, in order to give a clear view, without danger of losing any material amount of gas. Undoubtedly the reason for this is that most of the gas is projected to the sides of the holds under the decks. It will be noted that the entire operation is carried out from the deck.

DIFFUSION

The diffusion of the gas is immediate and remarkably uniform. Maximum concentration is attained at once and attained where it is needed, that is, around the walls of the inclosure. Samples taken from the far recesses under the decks, at various levels, and at

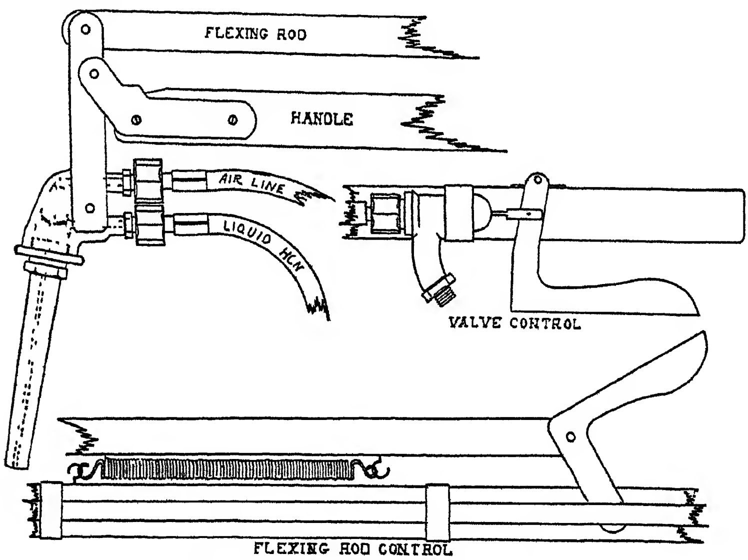

FIGURE 1.—Details of air-jet sprayer (air-jet gun)

various levels in the hatchway, show practically the same concentration at all times during the fumigation, except that it is usually somewhat less at the top of the hatch, probably due to loss of gas through the tarpaulin.

The initial concentration found is usually the calculated concentration, that is 60 grams (2 ounces) per thousand cubic feet. The final concentration at the end of two hours varies, largely in proportion to the amount of wind. When the wind is high, losses through tarpaulins are greater than when there is little breeze. On quiet days the final concentration is frequently still between 45 and 60 grams per thousand cubic feet. Samples taken from the ordinary types of harborage—that is, pipe casings and other similar inclosed spaces—generally show lethal concentration for rats within half an hour.

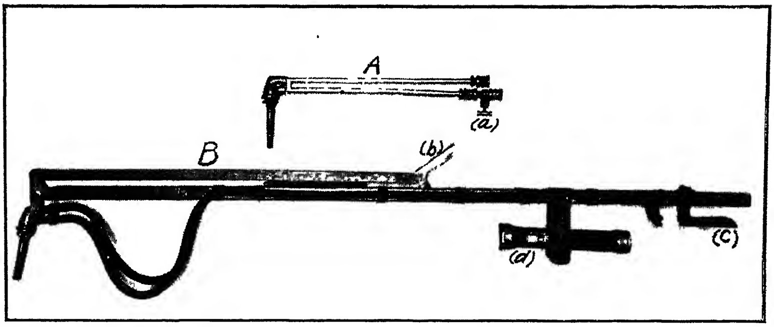

FIGURE 2.—A, Small air jet sprayer; B, large air jet sprayer (air jet gun), with overall length of 30 inches. (a), Control valve; (b), flexion control; (c), valve control; (d), electric flash light

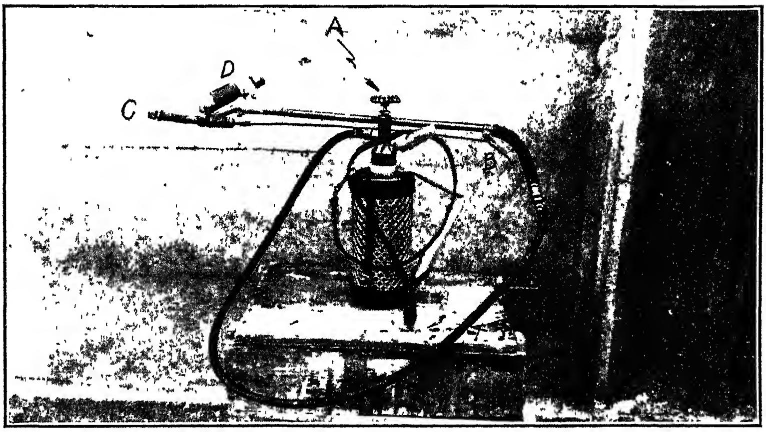

FIGURE 3.—Pressure bottle and sprayer, for use in isolated places difficult of access. Bottle is inclosed in woven steel netting. A, Main stop valve; B, valve control; C, spray head; D, hand flash light

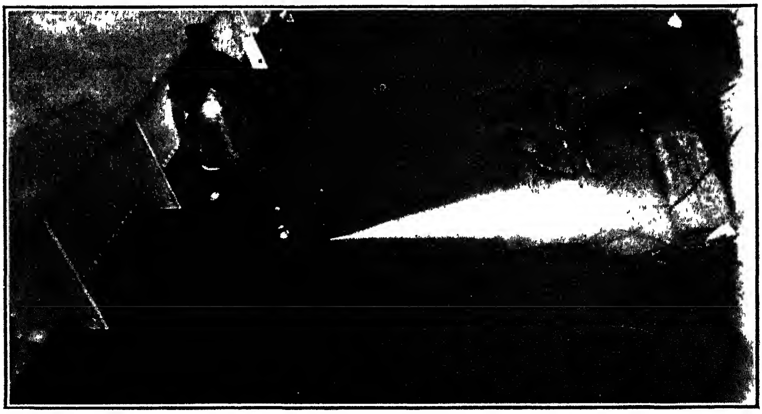

FIGURE 4.—Spray from air jet gun. A fine, mist-like spray, visible for eight feet or more, is projected

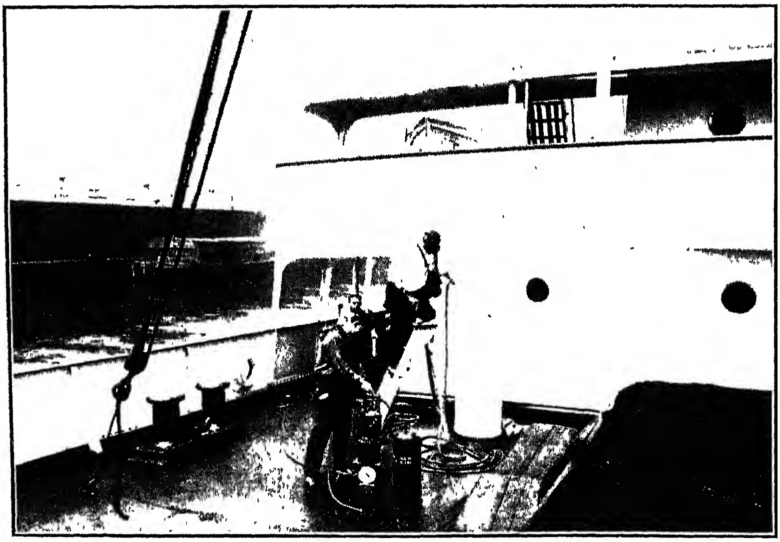

FIGURE 5.—Air jet sprayer in use on a loaded ship. The air line from the fumigating boat is connected with the air tank

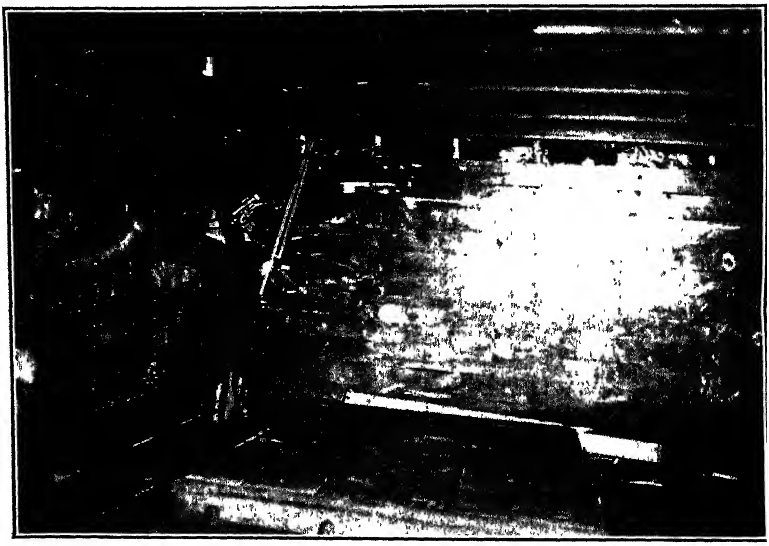

FIGURE 6.—Projecting HCN spray directly into rat-infested insulation of a cold-storage room. The apparatus shown is the first one used, in which the handle and valve were assembled separately. A strip of casing has been removed to permit direct application of fumigant to insulated space

FUMIGATING LOADED SHIPS

In fumigating loaded ships we have two main problems—one is to introduce gas in proper amounts in the various levels of the holds; the other is to secure diffusion over, around, and through the cargo. It must be obvious to any experienced fumigator that the apparatus described lends itself to the accomplishment of these purposes better than any fumigating apparatus at present in general use.

When Zyklon is poured down the ventilator into loaded holds, accurate doses in the various levels can not be obtained, since the amount of Zyklon diverted through the ventilator openings at the different levels can not be controlled. Furthermore, Zyklon, poured down the ventilators falls on the cargo directly under the ventilator openings, from which point the evaporating HCN must pass through the hold by slow diffusion. While it is true that this diffusion may be promoted by turning the ventilator cowl to the wind, such a method is not highly accurate. When a cowl is left inadvertently turned away from the wind, the HCN evaporating from Zyklon is largely drawn up the ventilator and lost.

The air jet sprayer, however, can be lowered through the ventilator openings to each level in turn, delivering measured doses to each, while the spray, projected forcibly over the top of the cargo, diffuses the gas widely in all directions.

FUMIGATING SUPERSTRUCTURES

The small air jet sprayer, used in the holds, is not well adapted for fumigating superstructures. For this purpose the large air jet sprayer (air jet gun) may be used, or, more conveniently, the pressure bottle, both of which are shown in the accompanying illustrations.

THE LARGE AIR JET GUN

The large air jet gun is an adaptation of the sprayer for use in projecting the fumigant directly into rat harborages. Where there exist rat harborages, into which it is unlikely that the gas will itself penetrate in lethal concentration, the nozzle of the gun may be passed through small openings and the spray projected directly into them, securing a penetration far deeper than could be expected by any other means now in use.

In order to control the spray, the gun has a double valve set on the handle. This valve, when its handle is pressed, opens both the air and gas line, closing both when the handle is released. It has been found by test that the amount of gas delivered can be figured approximately at 15 grams per second. In usual practice, it is rare that more than this amount is required for any one section of harborage.

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It hardly seems necessary to add that fumigators handling this gun wear gas masks and that usually two men are needed, one to handle the gun and the other to keep the supply lines clear.

Reference to the accompanying drawing and photographs will show that the air jet gun consists essentially of an air jet sprayer attached to a handle by a hinge and controlled, as to direction, by a push rod and lever, which is also hinged to the handle and kept extended by a spring. The sprayer is flexed by pressing the lever up against the handle. A spring clip on the underside of the handle holds a flash light directed toward the nozzle. The short inlet pipes of the sprayer are joined to the double valve, set on the handle, by short lengths of pressure rubber tubing. In use the fumigator controls the direction of the nozzle with one hand and the valves with the other.

PRESSURE BOTTLE

The pressure bottle has been devised at the New York quarantine station for convenience in fumigating small spaces with liquid HCN. It consists of a very heavy glass bottle protected on the outside by a metal wire mesh and two leather caps, a short length of pressure tubing, and a trigger valve sprayer. The delivery tube opens at the bottom of the bottle, the liquid HCN being forced out by pressure, applied by screwing a steel capsule of compressed carbon dioxide down upon the hollow pointed needle valve, set in one side of the bottle cap. The flow through the delivery tube is controlled by two valves, one a needle valve set in the cap, and the other a trigger controlled spring valve just back of the spray nozzle. While the bottle is being carried around the needle valve is closed; the fumigator opens it just before use. The cap is screwed on to the top of the bottle, tight closure being secured by a rubber gasket. This cap is removed in filling the bottle with HCN, which is generally accomplished through a short length of tubing from an HCN applicator. The bottle holds a little over 480 grams of HCN.

With this apparatus slung from the shoulder the fumigator passes from compartment to compartment of the superstructure, introduces the sprayer into each and sprays in the amount of gas required. Approximately 15 grams per second is delivered, but dosage may be more accurately controlled, if desired, by means of a scale set on the outside of the bottle against which the level of the liquid within may be read.

DISADVANTAGES

The new apparatus has one major disadvantage—it requires the use of compressed air. For this reason it is probable that it can not be adopted at quarantine stations where the volume of fumigation is

small. At the larger stations, however, there appears to be no specific bar to the installation of air-compression apparatus.

Another disadvantage in the use of liquid HCN is the danger of transportation over land. The containers at present approved by the Interstate Commerce Commission are too heavy to be handled readily on shipboard. The lighter containers for use on ships can be transported only by the quarantine boat. When a fumigating boat is available, the air compression apparatus may be installed as a part of its machinery.

COMMENT

The New York quarantine station maintains a card-index record of all ships fumigated at New York. Among the ships that regularly visit the port, and of which there are fumigation records over several years, there are a number that have been persistently rat-infested, every fumigation, with few exceptions, yielding rats. Many of these ships have been very heavily rat infested. During the past two years the apparatus described in this paper, and other projection apparatus tested in developing it, has been utilized in an intensive campaign to eradicate the rat colonies on these vessels. Success has not always been attained, but it is believed that the results set forth in Table 1 demonstrate its possibilities.

TABLE 1.—*Record of fumigations at New York with air-jet sprayer*

Ship No.	Previous record				Intensive fumigations, number of rats			Subsequent fumigations, number of rats		
	Period of record (years)	Number of fumigations	Average rats per fumigation	Maximum rats for any one fumigation	First	Second	Third	First	Second	Third
1	6	11	30	54	35			5	34	
2	4	8	25	79	23	33		0	14	19
3					130	0				
4	4	1	42	42	67	36		1		
5	3	3	69	206	84	29	4	3	7	
6	2	2	88	143	42	2				
7	5	8	43	127	70	1	0			
8	7	4	42	63	120	51	2			
9	4	3	2	6	15	0				
10	6	9	22	71	23	5				
11	4	2	35	39	135			22		
12					112	1				
13	2	3	21	26	17			1		
14	6	7	46	108	129			7		
15	2	4	42	70	52			2		
16	6	4	31	54	36			1	0	
17	4	8	35	72	30			0		
18	5	5	42	8	31	6		0	5	
19	3	3	71	134	91	17	21	1		
20	8	11	55	106	139	115				
21	4	5	195	352	115	68				

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for May, 1931

The accompanying table, taken from the Statistical Bulletin for June, 1931, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for May, 1931, as compared with that for the preceding month and for the corresponding month of last year. It also gives the cumulative rates for the period January–May for the years 1930 and 1931. The rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada. In recent years the general death rate in this more or less selected group of persons has averaged about 72 per cent of the rate for the registration area of the United States.

With regard to health conditions in this group for May, 1931, as indicated by mortality, the Bulletin states:

Health conditions in May, 1931, were better than have ever been observed during the month of May in any previous year. This is indicated by the remarkably low death rate of 8.4 per 1,000 among the industrial policyholders of the company. The nearest approach to the above figure is 8.8, as recorded in the same month of both 1921 and 1930.

Since the influenza outbreak of last winter, health conditons have shown such marked improvement that the year-to-date death rate at the end of May was only 1.8 per cent in excess of the lowest figure for the like part of any previous year. Among Canadian policyholders and those in the Pacific Coast and Mountain States, the cumulative death rate has been lower this year than ever before registered for the January-May period. In Canada, the decline, as compared with 1930, is 8.4 per cent.

Diphtheria and tuberculosis continue to be the most noteworthy items on the favorable side of the year's health record. The cumulative death rate for the former (4.9 per 100,000) marks a decline of more than 37 per cent from the figure for the corresponding five months' period in 1930, and a drop of 52 per cent since 1929. The drop for tuberculosis in a single year has been 5.4 per cent and in two years 14.8 per cent. It is now almost a certainty that the year 1931 will register a new low point in the death rate from tuberculous disease. As for diphtheria, it would require an outbreak, such as has not occurred in many years, to preclude the attainment of a new low death rate this year. Puerperal conditions, also, are causing fewer deaths than ever before, and lower cumulative mortality rates, as compared with the like part of 1930, are in evidence for whooping cough, diarrheal diseases, and accidents.

One decidedly disturbing item in the mortality statistics of this year is an unusually large rise in the cancer death rate. While the general trend of the mortality from cancer has been upward for many years, there has been little change from year to year. Thus far in 1931, however, the rate has increased more than 8 per cent as compared with the corresponding period of 1930. Every month has shown a considerably higher cancer death rate than that for the corresponding month of last year.

Other causes of death to register higher mortality rates for the first five months of 1931 than in the like part of 1930 are measles and scarlet fever (both by small margins); influenza (by 64 per cent); diabetes (by 13 per cent); and pneumonia, suicides, and homicides (all by small margins).

Death rates (annual basis) per 100,000 for principal causes of death

[Industrial department, Metropolitan Life Insurance Co.]

Cause of death	Death rate per 100,000 lives exposed [1]				
	May, 1931	April, 1931	May, 1930	Cumulative, January to May	
				1931	1930
Total, all causes	841.8	975.1	884.5	971.1	953.5
Typhoid fever	1.6	.9	1.2	1.2	1.2
Measles	5.9	5.9	6.1	4.6	4.5
Scarlet fever	3.9	4.2	2.6	4.0	3.6
Whooping cough	3.4	2.8	4.5	3.7	4.7
Diphtheria	4.2	3.0	5.8	4.9	7.8
Influenza	16.9	33.0	14.1	38.5	23.5
Tuberculosis (all forms)	79.5	80.5	85.9	81.7	86.4
Tuberculosis of respiratory system	70.0	70.0	74.7	72.5	75.1
Cancer	77.4	82.8	74.2	82.6	76.4
Diabetes mellitus	18.9	22.9	18.6	23.0	20.4
Cerebral hemorrhage	60.4	68.8	60.5	66.5	63.8
Organic diseases of heart	145.3	168.4	145.8	166.2	161.9
Pneumonia (all forms)	71.8	111.0	90.6	114.8	111.8
Other respiratory diseases	10.2	13.3	12.2	13.1	13.2
Diarrhea and enteritis	8.8	9.4	11.5	9.9	11.7
Bright's disease (chronic nephritis)	64.4	73.7	68.6	72.5	72.4
Puerperal state	10.4	13.3	11.6	11.8	12.8
Suicides	9.5	11.2	10.2	9.6	9.5
Homicides	7.3	6.0	6.0	6.6	6.5
Other external causes (excluding suicides and homicides)	51.8	53.4	57.2	52.5	56.7
Traumatism by automobiles	18.1	18.5	19.3	18.3	18.0
All other causes	190.2	210.7	197.1	203.4	204.7

[1] All figures in this table include insured infants under 1 year of age. The rates for 1931 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

COURT DECISION RELATING TO PUBLIC HEALTH

State of New Jersey held entitled to injunction restraining city of New York from dumping garbage at sea.—(United States Supreme Court; State of New Jersey *v.* City of New York, 51 S. Ct. 519; decided May 18, 1931.) The State of New Jersey brought an original suit in the Supreme Court of the United States against the city of New York, it being alleged that the city for many years had dumped and still was dumping noxious, offensive, and injurious materials—called garbage for brevity—into the ocean, and that great quantities of the same moving on or near the water's surface frequently had been and were being cast upon the beaches belonging to the State, its municipalities, and its citizens, thereby creating a public nuisance and causing great and irreparable injury. The State prayed for an injunction restraining the city from dumping garbage into the ocean or waters of the United States off the coast of New Jersey and from otherwise polluting its waters and beaches. The court appointed a special master to take the evidence and to report the same, together with his findings of fact, conclusions of law, and recommendations for a decree. Findings of fact were made by the master, which findings were approved and adopted by the court.

The master's conclusions of law were that the city had created and continued to create a public nuisance on the property of New Jersey and that the latter was entitled to relief in accordance with the prayer of its complaint, but that the city should be given reasonable time within which to put into operation sufficient incinerators. Such conclusions were also approved by the court.

The defendant, in accordance with permits issued by the supervisor of the harbor of New York, dumped garbage into the ocean at points about 10, 12½, and 22 miles, respectively, from the New Jersey shore, and it contended that, as it dumped garbage into the ocean and not within the waters of the United States or of New Jersey, the supreme court was without jurisdiction to grant an injunction. Answering this the court said:

> * * * But the defendant is before the court and the property of plaintiff and its citizens that is alleged to have been injured by such dumping is within the court's territorial jurisdiction. The situs of the acts creating the nuisance, whether within or without the United States, is of no importance. Plaintiff seeks a decree in personam to prevent them in the future. The court has jurisdiction. (Cases cited.)

With regard to the defendant's contention that compliance with the supervisor's permits in respect of places designated for the dumping of its garbage left the court without jurisdiction to grant the injunction prayed and relieved defendant in respect of the nuisance resulting from the dumping, the court held that there was no merit in such contention, saying:

> * * * There is nothing in the act that purports to give to one dumping at places permitted by the supervisor immunity from liability for damage or injury thereby caused to others or to deprive one suffering injury by reason of such dumping of relief that he otherwise would be entitled to have. There is no reason why it should be given that effect.

The court held that a decree would be entered declaring that New Jersey was entitled to an injunction as prayed in the complaint, but that, before injunction should issue, a reasonable time would be accorded to the city within which to carry into effect its proposed plan for the erection and operation of incinerators to destroy the materials such as were being dumped at sea, or to provide other means to be approved by the decree for the disposal of such materials. Inasmuch as the evidence did not disclose what was such reasonable time, the court referred the case to the special master for findings of fact upon that subject.

DEATHS DURING WEEK ENDED JULY 4, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended July 4, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended July 4,1931	Corresponding week, 1930
Policies in force	75, 049, 104	76, 053, 026
Number of death claims	12, 274	10, 153
Death claims per 1,000 policies in force, annual rate	8. 5	7. 0

Deaths [1] from all causes in certain large cities of the United States during the week ended July 4, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended July 4, 1931				Corresponding week, 1930		Death rate [2] for the first 27 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	8, 583	12. 5	630	[4] 48	10. 0	628	12. 9	12. 7
Akron	44	8. 9	1	10	7. 1	7	8. 3	8. 2
Albany [5]	15	6. 1	1	20	9. 8	1	14. 6	15. 5
Atlanta	113	21. 2	10	102	13. 0	15	16. 0	16. 8
White	66	------	5	79	------	6	------	------
Colored	47	(6)	5	144	(6)	9	(6)	(6)
Baltimore [5]	208	13. 3	20	68	10. 2	10	15. 6	14. 7
White	143	------	11	48	------	7	------	------
Colored	65	(6)	9	141	(6)	3	(6)	(6)
Birmingham	78	15. 1	12	121	17. 5	11	14. 6	14. 4
White	34	------	7	120	------	4	------	------
Colored	44	(6)	5	122	(6)	7	(6)	(6)
Boston	177	11. 8	20	57	12. 5	18	15. 2	15. 4
Bridgeport	31	11. 0	2	33	10. 3	1	12. 1	12. 2
Buffalo	125	11. 2	9	37	11. 0	13	14. 1	13. 9
Cambridge	19	8. 7	2	40	6. 9	2	13. 4	13. 2
Camden	23	10. 1	3	52	6. 6	1	15. 5	14. 4
Canton	23	11. 2	2	46	10. 4	0	11. 1	10. 9
Chicago [5]	1, 222	18. 4	58	51	9. 1	59	11. 6	11. 1
Cincinnati	147	16. 8	15	90	11. 8	4	16. 8	16. 2
Cleveland	203	11. 6	11	32	8. 7	16	11. 9	12. 0
Columbus	77	13. 6	6	59	12. 2	2	14. 7	17. 1
Dallas	52	10. 0	5	------	10. 9	7	12. 0	12. 1
White	39	------	4	------	------	5	------	------
Colored	13	(6)	1	------	(6)	2	(6)	(6)
Dayton	51	12. 9	2	28	8. 8	4	12. 9	10. 4
Denver	62	11. 1	8	77	14. 1	12	14. 8	15. 0
Des Moines	40	14. 4	1	18	10. 9	2	12. 0	12. 4
Detroit	222	7. 0	27	43	7. 2	30	9. 1	10. 1
Duluth	8	4. 1	1	25	8. 2	0	11. 0	11. 6
El Paso	25	12. 4	6	------	22. 3	12	17. 2	18. 8
Erie	15	6. 6	0	0	7. 6	4	11. 2	11. 4
Fall River [5 7]	20	9. 0	0	0	10. 9	3	12. 8	13. 2
Flint	29	9. 2	2	26	5. 9	3	7. 8	9. 9
Fort Worth	29	9. 0	4	------	11. 8	3	11. 6	11. 6
White	25	------	3	------	------	1	------	------
Colored	4	(6)	1	------	(6)	2	(6)	(6)
Grand Rapids	34	10. 3	3	44	7. 7	2	9. 8	11. 2
Houston	63	10. 6	7	------	14. 5	7	11. 5	12. 9
White	49	------	6	------	------	3	------	------
Colored	14	(6)	1	------	(6)	4	(6)	(6)
Indianapolis	127	17. 9	6	49	11. 4	2	14. 6	15. 2
White	105	------	4	38	------	2	------	------
Colored	22	(6)	2	134	(6)	0	(6)	(6)
Jersey City	58	9. 5	2	18	9. 2	6	12. 6	12. 3

Footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended July 4, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended July 4, 1931				Corresponding week, 1930		Death rate [2] for the first 27 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Kansas City, Kans.	38	16.1	5	103	6.8	1	14.2	11.5
White	32		3	74		0		
Colored	6	(6)	2	254	(6)	1	(6)	(6)
Kansas City, Mo.	138	17.6	7	53	11.7	10	14.4	13.6
Knoxville	29	13.8	1	21	15.2	5	13.5	14.6
White	22		1	24		4		
Colored	7	(6)	0	0	(6)	1	(6)	(6)
Long Beach	25	8.6	0	0	8.3	2	10.4	10.0
Los Angeles	238	9.4	21	61	10.3	21	11.2	11.5
Louisville	83	14.0	3	26	11.7	5	15.3	14.0
White	66		3	30		5		
Colored	17	(6)	0	0	(6)	0	(6)	(6)
Lowell [7]	18	9.3	3	76	12.4	4	13.5	14.6
Lynn	13	6.6	1	26	7.6	1	10.7	11.6
Memphis	97	19.5	9	95	18.7	13	17.3	18.0
White	49		3	50		6		
Colored	48	(6)	6	174	(6)	7	(6)	(6)
Miami	23	10.7	1	25	10.8	2	12.8	12.0
White	16		0	0		2		
Colored	7	(6)	1	88	(6)	0	(6)	(6)
Milwaukee	163	14.4	15	65	7.1	12	10.2	10.3
Minneapolis	174	19.1	8	52	7.9	6	12.0	11.0
Nashville	65	21.8	6	89	14.2	7	17.5	16.6
White	43		5	100		5		
Colored	22	(6)	1	59	(6)	2	(6)	(6)
New Bedford [7]	23	10.7	4	106	11.1	1	13.2	12.1
New Haven	30	9.6	2	38	9.9	1	12.5	14.2
New Orleans	175	19.5	21	115	14.6	14	17.9	18.7
White	105		10	83		6		
Colored	70	(6)	11	179	(6)	8	(6)	(6)
New York	1,267	9.3	99	41	8.7	113	12.2	11.7
Bronx Borough	194	7.6	10	23	6.2	11	8.9	8.4
Brooklyn Borough	430	8.5	41	43	8.0	40	11.3	10.8
Manhattan Borough	456	13.1	36	61	12.6	46	18.6	17.5
Queens Borough	147	6.6	7	19	6.0	11	7.9	7.6
Richmond Borough	40	12.8	5	90	12.1	5	14.1	14.9
Newark, N. J.	106	12.4	8	42	8.2	5	12.7	13.2
Oakland	42	7.5	3	38	10.9	3	11.0	11.5
Oklahoma City	33	8.7	2	28	8.1	5	11.8	10.4
Omaha	95	22.9	4	45	14.3	7	14.8	13.9
Paterson	33	12.4	4	69	10.9	1	14.6	13.2
Peoria	59	28.4	0	0	6.4	1	13.6	12.9
Philadelphia	438	11.6	33	48	11.2	20	14.5	13.3
Pittsburgh	176	13.6	20	69	10.6	17	16.1	14.9
Portland, Oreg.	62	10.5	1	12	10.7	4	12.2	13.0
Providence	54	11.0	3	28	10.9	5	14.0	14.3
Richmond	45	12.7	4	58	12.2	5	16.5	15.8
White	29		2	44		3		
Colored	16	(6)	2	87	(6)	2	(6)	(6)
Rochester	104	16.3	6	55	9.4	3	13.0	12.3
St. Louis	444	28.0	18	61	10.8	6	16.9	14.5
St. Paul	98	18.5	4	41	6.5	1	11.6	10.8
Salt Lake City [5]	28	10.2	3	45	10.0	5	12.7	13.5
San Antonio	62	13.5	17		15.4	14	16.0	18.5
San Diego	26	8.7	2	41	12.9	2	14.5	14.7
San Francisco	133	10.7	3	20	10.8	5	13.5	13.3
Schenectady	13	7.0	0	0	6.5	0	10.8	11.9
Seattle	58	8.1	2	19	12.2	4	12.0	11.4
Somerville	13	6.4	1	37	8.0	1	10.3	10.8
South Bend	22	10.6	2	50	9.4	1	8.8	9.5
Spokane	30	13.4	2	52	9.0	0	12.9	13.1
Springfield, Mass.	23	7.9	3	46	9.4	4	12.9	13.2
Syracuse	54	13.2	2	24	8.4	3	12.5	12.7
Tacoma	16	7.7	0	0	14.1	0	13.0	13.0
Toledo	55	9.7	6	55	9.3	2	12.7	13.3
Trenton	27	11.4	2	35	11.4	3	17.9	17.5
Utica	22	11.2	1	26	9.7	2	15.2	16.0

Footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended July 4, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended July 4, 1931				Corresponding week, 1930		Death rate [2] for the first 27 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Washington, D. C.	145	15.3	12	66	13.5	9	16.8	15.8
White	90		5	41		4		
Colored	55	(6)	7	120	(6)	5	(6)	(6)
Waterbury	19	9.8	1	30	9.4	4	10.3	10.5
Wilmington, Del.[7]	24	11.7	3	65	11.3	2	15.3	15.2
Worcester	31	8.2	2	27	11.5	5	13.5	14.0
Yonkers	15	5.6	0	0	5.4	1	9.4	8.6
Youngstown	39	11.8	4	56	5.8	3	10.9	10.6

1 Deaths of nonresidents are included. Stillbirths are excluded.
2 These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
3 Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
4 Data for 77 cities.
5 Deaths for week ended Friday.
6 For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Forth Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
7 Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended July 11, 1931, and July 12, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 11, 1931, and July 12, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930
New England States:								
Maine	5	10			31	42	0	1
New Hampshire	1				11	10	0	0
Vermont	1	2			24	10	0	0
Massachusetts	51	37	2	1	330	440	1	2
Rhode Island	4	2			92	11	0	1
Connecticut	5	1		1	110	20	1	1
Middle Atlantic States:								
New York	117	98	[1] 10	[1] 1	1,299	1,075	9	11
New Jersey	35	91		2	352	535	5	2
Pennsylvania	53	71			840	638	9	1
East North Central States:								
Ohio	28	42	4	6	734	194	5	5
Indiana	15	10			94	53	4	4
Illinois	67	113	10	3	631	138	7	8
Michigan	14	54	1	1	198	266	5	6
Wisconsin	5	12	9	2	318	54	1	0
West North Central States:								
Minnesota	3	10			48	99	1	1
Iowa		4			3	53	0	1
Missouri	12	22			16	43	1	3
North Dakota	3				4	4	0	1
South Dakota	1	13			1	50	0	1
Nebraska	2	10			1	10	0	0
Kansas	1	7	4		26	63	1	0
South Atlantic States:								
Delaware	1				34	7	0	0
Maryland [2]	8	12	1	3	119	18	2	0
District of Columbia	4	5			12	22	2	0
West Virginia	3	4	2	9	25	20	0	0
North Carolina [3]	13	18	2	5	190	30	1	0
South Carolina	4	2		52	36		0	2
Georgia [3]	8	4	8	6	19	10	1	1
Florida [3]	6	4	3	2	26	16	0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 5 cases; 1 case in North Carolina; 1 case in Georgia; 1 case in Florida; 1 case in Alabama; and 1 case in Texas.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 11, 1931, and July 12, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930
East South Central States:								
Kentucky	-------	-------	-------	-------	56	-------	2	1
Tennessee	-------	3	-------	8	11	24	0	3
Alabama [3]	10	6	-------	1	39	36	1	0
Mississippi	6	4	-------	-------	-------	-------	0	2
West South Central States:								
Arkansas	4	1	-------	7	2	4	0	0
Louisiana	20	19	15	3	-------	1	0	1
Oklahoma [4]	3	6	12	4	5	17	0	2
Texas [3]	21	10	-------	1	18	14	0	1
Mountain States:								
Montana	-------	1	-------	-------	18	2	0	1
Idaho	1	1	-------	-------	1	4	0	2
Wyoming	1	-------	-------	1	5	10	0	0
Colorado	6	6	-------	-------	28	68	0	0
New Mexico	1	3	-------	-------	5	13	0	0
Arizona	1	-------	-------	-------	5	61	0	1
Utah [2]	-------	-------	3	1	9	19	0	4
Pacific States:								
Washington	6	6	-------	3	52	192	1	1
Oregon	2	5	12	3	13	32	1	0
California	48	53	9	19	232	552	3	4

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930
New England States:								
Maine	0	0	9	19	0	0	1	0
New Hampshire	0	0	10	1	0	0	0	0
Vermont	0	0	2	0	12	0	0	0
Massachusetts	6	6	113	73	0	0	5	8
Rhode Island	1	0	10	6	0	0	0	1
Connecticut	7	0	19	7	0	0	1	1
Middle Atlantic States:								
New York	36	10	189	121	25	13	17	22
New Jersey	3	0	78	54	1	0	5	8
Pennsylvania	3	1	209	126	0	0	15	12
East North Central States:								
Ohio	0	1	124	121	29	51	22	21
Indiana	0	5	23	42	49	76	3	11
Illinois	2	3	125	146	46	34	17	26
Michigan	0	1	158	99	14	40	4	4
Wisconsin	3	0	21	40	4	10	8	0
West North Central States:								
Minnesota	1	6	19	38	2	1	2	2
Iowa	0	2	10	14	42	48	1	0
Missouri	0	0	15	32	5	12	12	13
North Dakota	0	0	3	3	6	10	0	4
South Dakota	2	1	4	4	1	41	1	0
Nebraska	1	0	2	5	8	10	3	0
Kansas	0	9	7	19	23	21	5	7
South Atlantic States:								
Delaware	0	0	4	9	0	0	1	1
Maryland [2]	0	0	19	18	0	0	14	8
District of Columbia	0	0	11	6	0	0	0	1
West Virginia	0	0	11	9	3	17	6	11
North Carolina [3]	4	6	19	21	0	13	47	58
South Carolina	4	1	1	1	0	0	112	59
Georgia [3]	1	1	10	4	2	0	41	59
Florida [3]	1	0	0	4	0	0	6	2

[2] Week ended Friday.
[3] Typhus fever: 1931, 5 cases; 1 case in North Carolina; 1 case in Georgia; 1 case in Florida; 1 case in Alabama; and 1 case in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 11, 1931, and July 12, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930	Week ended July 11, 1931	Week ended July 12, 1930
East South Central States:								
Kentucky	0	0	13	18	1	0	32	22
Tennessee	0	1	6	7	4	10	42	56
Alabama [3]	4	3	15	2	8	0	38	24
Mississippi	4	1	4	4	16	1	38	58
West South Central States:								
Arkansas	0	1	0	4	12	12	64	30
Louisiana	0	29	6	12	9	1	49	34
Oklahoma [4]	0	14	7	11	17	42	23	18
Texas [3]	0	1	17	5	29	24	24	16
Mountain States:								
Montana	0	4	6	23	1	5	6	1
Idaho	0	0	2	0	0	3	2	0
Wyoming	0	0	1	2	1	1	1	0
Colorado	0	0	10	8	0	5	5	3
New Mexico	0	3	1	5	1	2	2	9
Arizona	0	2	2	2	0	0	2	10
Utah [2]	0	0	1	2	0	0	4	0
Pacific States:								
Washington	1	2	23	25	22	43	5	2
Oregon	0	0	2	7	14	9	3	7
California	6	69	47	50	12	33	11	19

[2] Week ended Friday.
[3] Typhus fever: 1931, 5 cases; 1 case in North Carolina; 1 case in Georgia; 1 case in Florida; 1 case in Alabama; and 1 case in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June, 1931										
Indiana	17	105	10	-	1,321	-	2	354	350	15
Iowa	-	13	-	-	125	-	1	237	106	7
North Dakota	6	15	-	-	172	-	2	51	48	5
Pennsylvania	39	289	-	-	9,061	4	4	1,839	1	52
Porto Rico	-	45	210	1,623	21	2	0	-	0	19
Tennessee	20	27	57	106	1,327	86	3	151	55	68
Vermont	-	2	-	-	228	-	0	22	36	-
Wyoming	-	5	-	-	52	-	1	32	3	-

June, 1931	Cases
Chicken pox:	
Indiana	194
Iowa	163
North Dakota	69
Pennsylvania	1,801
Porto Rico	5
Tennessee	69
Vermont	104
Wyoming	30
Colibacillosis:	
Porto Rico	5
Dysentery:	
Porto Rico	33
Tennessee	20
Filariasis:	
Porto Rico	3
German measles:	
Iowa	25
Pennsylvania	819
Tennessee	11
Hookworm disease:	
Tennessee	1
Impetigo contagiosa:	
Tennessee	2
Lethargic encephalitis:	
North Dakota	2
Pennsylvania	6
Mumps:	
Indiana	67
Iowa	83

Mumps—Continued.	Cases
North Dakota	40
Pennsylvania	1,533
Porto Rico	3
Tennessee	57
Vermont	79
Wyoming	35
Ophthalmia neonatorum:	
Pennsylvania	8
Porto Rico	3
Tennessee	5
Paratyphoid fever:	
Iowa	3
Porto Rico	1
Tennessee	2
Puerperal septicemia:	
Pennsylvania	24
Porto Rico	7
Tennessee	3
Rocky Mountain spotted or tick fever:	
Wyoming	10
Septic sore throat:	
Tennessee	1
Tetanus:	
Iowa	1
Pennsylvania	6
Porto Rico	10
Tennessee	4

Tetanus, infantile:	Cases
Porto Rico	18
Trachoma:	
Pennsylvania	2
Tularaemia:	
Tennessee	1
Wyoming	1
Undulant fever:	
Indiana	2
Iowa	4
North Dakota	1
Pennsylvania	1
Vincent's angina:	
Iowa	1
North Dakota	34
Tennessee	5
Wyoming	1
Whooping cough:	
Indiana	265
Iowa	168
North Dakota	44
Pennsylvania	1,107
Porto Rico	214
Tennessee	251
Vermont	25
Wyoming	29

Cases of Certain Communicable Diseases Reported for the Month of February, 1931, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	204	18	103	285	134	0	37	6	229
New Hampshire		1			46	0		0	
Vermont	90	1	62	136	31	1	12	0	75
Massachusetts	1,296	208	2,196	525	1,510	0	483	12	583
Rhode Island	99	40	14	84	246	0	40	4	55
Connecticut	384	45	1,338	281	224	0	79	1	201
New York	2,445	456	3,477	1,428	3,326	38	1,562	40	1,875
New Jersey	1,557	213	2,879	177	1,094	0	389	11	639
Pennsylvania	3,989	405	8,128	1,584	2,359	1	546	55	801
Ohio	2,360	214	1,881	1,067	2,220	239	654	38	421
Indiana	497	174	2,720	57	1,407	432	200	6	200
Illinois	1,543	533	4,484	1,392	1,910	228	641	13	419
Michigan	1,328	163	778	573	1,556	142	493	17	777
Wisconsin	1,688	63	1,326	2,351	631	28	147	8	501
Minnesota	639	55	205		401	43	196	11	216
Iowa	325	34	39	58	554	249	24	1	33
Missouri	510	181	3,692	154	1,339	257	173	13	103
North Dakota	119	42	37	59	132	38	12	5	58
South Dakota	127	29	62	24	93	118	12	1	16
Nebraska	328	48	15	285	212	222	22	5	84
Kansas	727	59	71	339	279	373	161	2	122
Delaware	37	3	65	20	105	0	19	0	20
Maryland	874	87	2,063	225	453	0	195	12	123
District of Columbia		53	270		94	0	98	1	18
Virginia	833	147	2,795		344	8	208	28	384
West Virginia	305	45	251		87	44	39	10	220
North Carolina	813	114	1,446		274	8		8	386
South Carolina	422	108	583	173	58	14	155	15	213
Georgia	266	32	500	171	260	4	107	20	47
Florida	240	30	637	26	31	0	32	13	29
Kentucky [1]									
Tennessee	526	57	1,268	179	477	39	153	20	104
Alabama	38	111	2,063	156	129	27	395	28	54
Mississippi	1,092	67	190	348	131	90	123	20	442

[1] Reports received weekly.

Cases of Certain Communicable Diseases Reported for the Month of February, 1931, by State Health Officers—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Arkansas	167	38	25	29	82	91	[2] 22	19	100
Louisiana	65	174	14	9	100	120	[2] 126	35	24
Oklahoma [3]	100	95	109	20	141	369	50	17	26
Texas		192			183			35	
Montana	109	8	10	161	196	13	45	6	165
Idaho					87			20	
Wyoming	120	3	9	28	131	9		1	61
Colorado	321	37	758	207	200	28	71	5	169
New Mexico	70	19	148	79	30	11	65	2	12
Arizona	78	24	760	27	2	7	116		16
Utah [1]									
Nevada	13	4	39	50	5		11		2
Washington	455	67	198	235	242	125	156	7	229
Oregon	206	41	332	304	104	104	44	1	78
California	2,710	220	3,794	1,217	556	258	941	49	744

[1] Reports received weekly.
[2] Pulmonary.
[3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 100,000 Population (Annual Basis) for the Month of February, 1931

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	332	29	168	464	218	0	60	10	373
New Hampshire		3			128	0		0	
Vermont	325	4	224	492	112	4	43	0	271
Massachusetts	393	63	666	159	458	0	146	4	177
Rhode Island	185	75	26	157	460	0	75	7	103
Connecticut	306	36	1,067	224	179	0	63	1	160
New York	248	46	353	145	337	4	158	4	190
New Jersey	489	67	904	56	344	0	122	3	201
Pennsylvania	534	54	1,088	212	316	0	73	7	107
Ohio	455	41	363	206	428	46	126	7	81
Indiana	198	69	1,082	23	560	172	80	2	80
Illinois	259	89	752	234	320	38	108	2	70
Michigan	347	43	203	150	407	37	129	4	203
Wisconsin	739	28	581	1,030	276	12	64	4	219
Minnesota	322	28	103		202	22	99	6	109
Iowa	171	18	21	30	291	131	13	1	17
Missouri	182	65	1,316	55	477	92	62	5	37
North Dakota	226	80	70	112	251	72	23	10	110
South Dakota	237	54	116	45	173	220	22	2	30
Nebraska	308	45	14	268	199	209	21	5	79
Kansas	500	41	49	233	192	257	117	1	84
Delaware	201	16	353	109	570	0	103	0	109
Maryland	689	69	1,626	177	357	0	154	9	97
District of Columbia		140	714		249	0	259	3	48
Virginia	446	79	1,496		184	4	111	15	206
West Virginia	226	33	186		64	33	29	7	163
North Carolina	327	46	581		110	3		3	155
South Carolina	315	81	435	129	43	10	116	11	159
Georgia	119	14	224	77	116	2	48	9	21
Florida	205	26	543	22	26	0	27	11	25
Kentucky [1]									
Tennessee	259	28	624	88	235	19	75	10	51
Alabama	18	54	1,002	76	63	13	192	14	26
Mississippi	699	43	122	223	84	58	79	13	283
Arkansas	117	27	17	20	57	64	[2] 15	13	70
Louisiana	40	106	9	5	61	73	[2] 77	21	15
Oklahoma [3]	62	59	68	12	88	230	31	11	16
Texas		42			40			8	

[1] Reports received weekly.
[2] Pulmonary.
[3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 100,000 Population (Annual Basis) for the Month of February, 1931—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Montana	264	19	24	390	475	32	109	15	400
Idaho					254			58	
Wyoming	682	17	51	159	745	51		6	347
Colorado	399	46	943	258	249	35	88	6	210
New Mexico	212	57	448	239	91	33	197	6	36
Arizona	227	70	2,212	79	6	20	338		47
Utah [1]									
Nevada	183	56	548	703	70		155		28
Washington	373	55	162	193	199	103	128	6	188
Oregon	276	55	444	407	139	139	59	1	104
California	594	48	831	267	122	57	206	11	163

[1] Reports received weekly.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,815,000. The estimated population of the 88 cities reporting deaths is more than 31,270,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended July 4, 1931, and July 5, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	614	650	
95 cities	297	359	592
Measles:			
45 States	6,593	5,538	
95 cities	2,183	1,677	
Meningococcus meningitis:			
46 States	56	70	
95 cities	26	71	
Poliomyelitis:			
46 States	45	173	
Scarlet fever:			
46 States	1,726	1,141	
95 cities	657	462	586
Smallpox:			
46 States	571	781	
95 cities	37	40	28
Typhoid fever:			
46 States	476	532	
95 cities	64	62	63
Deaths reported			
Influenza and pneumonia:			
88 cities	401	341	
Smallpox:			
88 cities	0	0	

City reports for week ended July 4, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	11	0	0	----------	0	1	1	0
New Hampshire:								
Concord	0	0	0	----------	0	1	0	1
Nashua	0	0	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	4	0	0
Burlington	0	0	0	----------	0	0	0	0
Massachusetts:								
Boston	28	24	31	2	0	41	7	6
Fall River	0	2	2	----------	0	16	4	0
Springfield	1	2	0	----------	0	14	11	0
Worcester	8	2	3	----------	0	1	10	2
Rhode Island:								
Pawtucket	0	0	0	----------	0	3	0	0
Providence	1	4	3	----------	0	66	6	2
Connecticut:								
Bridgeport	1	3	1	----------	0	7	3	3
Hartford	1	2	0	----------	0	1	0	0
New Haven	3	0	0	----------	0	12	1	1
MIDDLE ATLANTIC								
New York:								
Buffalo	9	8	3	----------	0	51	12	18
New York	----------	188	97	6	0	291	----------	80
Rochester	5	6	0	----------	0	147	8	3
Syracuse	15	1	1	----------	0	16	1	3
New Jersey:								
Camden	2	5	4	----------	0	0	0	1
Newark	25	10	6	1	0	10	2	1
Trenton	1	1	1	----------	0	5	2	2
Pennsylvania:								
Philadelphia	48	40	5	1	2	90	12	28
Pittsburgh	17	15	2	----------	1	21	21	13
Reading	15	1	0	----------	0	3	3	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	7	4	0	----------	0	20	4	7
Cleveland	31	21	4	----------	0	229	99	15
Columbus	6	2	0	----------	0	4	2	3
Toledo	33	4	4	1	1	15	9	2
Indiana:								
Fort Wayne	2	2	0	----------	0	0	0	1
Indianapolis	9	2	0	----------	0	53	3	11
South Bend	0	2	0	----------	0	2	0	2
Terre Haute	0	0	0	----------	0	2	0	3
Illinois:								
Chicago	94	75	61	1	1	561	33	38
Springfield	1	0	0	----------	0	1	3	2
Michigan:								
Detroit	63	35	13	----------	0	56	19	8
Flint	13	1	0	----------	0	0	2	3
Grand Rapids	4	1	0	----------	0	53	0	0

City reports for week ended July 4, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST NORTH CENTRAL—contd.								
Wisconsin:								
Kenosha	0	0	0	----------	0	3	42	0
Madison	0	0	0	----------	----------	0	0	----------
Milwaukee	----------	9	----------	----------	----------	----------	----------	----------
Racine	0	0	0	----------	0	2	8	0
Superior	4	0	0	----------	0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	3	0	0	----------	0		1	0
Minneapolis	7	10	3	----------	0	35	5	0
St. Paul	22	6	0	----------	0	18	0	4
Iowa:								
Davenport	3	1	0	----------	----------	0	0	----------
Des Moines	0	1	0	----------	----------	0	0	----------
Sioux City	7	0	1	----------	----------	0	3	----------
Waterloo	0	0	0	----------	----------	0	0	----------
Missouri:								
Kansas City	3	2	0	----------	0	11	0	7
St Joseph	0	0	3	----------	0	8	0	4
St. Louis	8	21	9	----------	----------		11	3
North Dakota:								
Fargo	0	0	0	----------	0	----------	0	0
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Aberdeen	0	0	0	----------	----------	1	0	----------
Nebraska:								
Omaha	2	2	1	----------	0	0	7	5
Kansas:								
Topeka	0	1	0	----------	2	1	31	1
Wichita	26	0	0	----------	1	0	0	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	1	----------	0	2	0	1
Maryland:								
Baltimore	15	13	3	1	1	66	18	12
Cumberland	1	0	0	----------	0	0	0	0
Frederick	0	0	0	----------	0	0	0	0
District of Columbia:								
Washington	18	5	2	----------	0	18	0	7
Virginia:								
Lynchburg	0	0	0	----------	0	0	0	1
Norfolk	0	0	1	----------	0	0	0	2
Richmond	0	1	0	----------	0	7	0	0
Roanoke	1	0	0	----------	0	2	0	0
West Virginia:								
Charleston	0	0	0	----------	0	0	0	0
Wheeling	1	0	0	----------	0	0	0	0
North Carolina:								
Raleigh	0	0	0	----------	0	13	0	0
Wilmington	0	0	0	----------	0	0	0	1
Winston-Salem	3	0	0	----------	0	36	4	0
South Carolina:								
Charleston	0	0	0	6	0	0	0	4
Columbia	----------	0	----------	----------	----------	----------	----------	----------
Greenville	0	0	0	----------	0	0	0	0
Georgia:								
Atlanta	0	1	0	----------	0	5	0	6
Brunswick	0	0	0	----------	0	0	1	0
Savannah	8	1	0	4	0	4	2	1
Florida:								
Miami	0	1	0	----------	0	8	0	0
Tampa	1	1	0	----------	1	1	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	----------	0	0	0	1
Tennessee:								
Memphis	1	1	1	----------	2	51	1	3
Nashville	0	0	0	----------	0	8	0	4

City reports for week ended July 4, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST SOUTH CENTRAL—contd.								
Alabama:								
Birmingham	0	1	0		1	0	1	4
Mobile	0	0	1		0	0	0	1
Montgomery	0	0	0	1		1	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			0	0	
Little Rock	0	0	0		0	0	0	2
Louisiana:								
New Orleans	0	5	0	2	2	0	0	11
Shreveport	2	0	0		0	1	1	1
Oklahoma:								
Muskogee	0	0	2		0	0	0	0
Oklahoma City	0	0	0		0	1	0	3
Texas:								
Dallas	0	3	2		0	1	1	1
Fort Worth	1	1	0		0	7	0	0
Galveston	0	0	0		0	0	0	3
Houston	0	2	4		0	4	0	2
San Antonio	0	1	2		1	1	0	6
MOUNTAIN								
Montana:								
Billings		0						
Great Falls	4	0	0		0	1	0	0
Helena	0	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	4	0	0		0	0	3	0
Colorado:								
Denver	7	7	1		1	17	8	4
Pueblo	1	0	0		0	4	0	1
New Mexico:								
Albuquerque	7	0	0		1	5	1	0
Arizona:								
Phoenix	0	0	0		1	1	0	2
Utah:								
Salt Lake City	8	2	0		0	1	4	1
Nevada:								
Reno	0	0	0		0	1	0	2
PACIFIC								
Washington:								
Seattle	23	2	2			5	10	
Spokane	2	2	0			2	0	
Tacoma	0	2	4		0	1	3	1
Oregon:								
Portland	5	5	0		0	6	3	6
Salem	1	0	0		0	0	7	0
California:								
Los Angeles	8	30	15	7	2	32	4	13
Sacramento	1	1	2		0	7	0	0
San Francisco	8	9	3		0	29	0	5

City reports for week ended July 4, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
NEW ENGLAND											
Maine:											
Portland	1	1	0	0	0	0	1	0	0	1	21
New Hampshire:											
Concord	0	0	0	0	0	1	0	0	0	0	13
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	2	0	0	0	0	0	0	0	2	2
Burlington	0	0	0	4	0	0	0	0	0	0	6
Massachusetts:											
Boston	9	38	0	0	0	11	1	3	0	21	-------
Fall River	2	2	0	0	0	1	0	0	0	6	20
Springfield	3	3	0	0	0	3	0	0	0	2	24
Worcester	5	13	0	0	0	0	0	0	0	9	31
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	9
Providence	4	9	0	0	0	6	0	0	0	4	54
Connecticut:											
Bridgeport	3	3	0	0	0	2	0	0	0	0	31
Hartford	2	2	0	0	0	1	0	0	0	6	35
New Haven	2	5	0	0	0	2	0	1	0	6	30
MIDDLE ATLANTIC											
New York:											
Buffalo	15	20	0	0	0	9	0	1	0	32	122
New York	108	117	0	-------	-------	89	14	7	2	-------	1,267
Rochester	5	20	0	0	0	4	0	0	0	12	95
Syracuse	5	5	0	0	0	3	0	0	0	22	54
New Jersey:											
Camden	3	2	0	0	0	3	0	0	0	1	23
Newark	12	20	0	1	0	12	1	0	0	76	132
Trenton	1	3	0	0	0	1	0	0	0	3	27
Pennsylvania:											
Philadelphia	47	91	0	0	0	33	1	2	0	43	438
Pittsburgh	19	22	0	0	0	9	1	1	0	26	176
Reading	2	2	0	0	0	2	0	0	0	0	30
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	8	11	1	0	0	13	1	1	0	1	147
Cleveland	23	15	1	0	0	14	1	0	0	45	203
Columbus	3	0	0	2	0	6	0	0	0	4	75
Toledo	8	2	0	0	0	4	1	0	0	22	55
Indiana:											
Fort Wayne	1	0	1	0	0	1	0	0	0	0	7
Indianapolis	5	0	4	6	0	3	0	0	0	53	-------
South Bend	1	1	0	0	0	0	0	0	0	0	20
Terre Haute	1	0	0	0	0	0	0	0	0	2	18
Illinois:											
Chicago	72	85	1	0	0	52	4	2	0	102	1,222
Springfield	1	2	0	2	0	3	0	0	0	0	49
Michigan:											
Detroit	57	61	1	3	0	22	2	2	0	149	222
Flint	6	5	1	0	0	1	1	0	0	1	29
Grand Rapids	5	5	0	0	0	0	0	0	0	7	34
Wisconsin:											
Kenosha	1	0	1	0	0	0	0	0	0	2	4
Madison	1	0	0	0	-------	-------	0	0	-------	0	-------
Milwaukee	13	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Racine	2	1	0	0	0	3	0	0	0	17	15
Superior	2	0	0	0	0	0	0	0	0	0	10

City reports for week ended July 4, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
WEST NORTH CENTRAL											
Minnesota:											
Duluth	5	0	0	0	0	1	0	0	0	0	8
Minneapolis	17	2	0	0	0	2	0	0	0	3	171
St. Paul	10	2	0	0	0	3	0	1	0	35	103
Iowa:											
Davenport	0	1	1	0	------	------	0	0	------	3	------
Des Moines	3	2	1	3	------	------	0	0	------	2	40
Sioux City	1	0	1	0	------	------	0	0	------	2	------
Waterloo	1	0	0	0	------	------	0	0	------	4	------
Missouri:											
Kansas City	5	0	0	0	0	16	1	0	0	3	138
St. Joseph	0	0	0	0	0	0	0	0	0	1	35
St. Louis	13	10	1	1	0	21	2	3	0	30	444
North Dakota:											
Fargo	2	0	0	0	0	0	0	0	0	3	7
Grand Forks	1	0	0	0	------	------	0	0	------	0	------
South Dakota.											
Aberdeen	0	1	0	0	------	------	0	0	------	0	------
Nebraska:											
Omaha	1	2	2	2	0	4	0	0	0	4	95
Kansas:											
Topeka	0	0	0	0	0	0	1	1	0	2	31
Wichita	1	0	0	2	0	0	0	0	0	6	41
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	3	0	0	0	0	0	0	0	1	24
Maryland:											
Baltimore	18	8	0	0	0	11	2	2	1	70	208
Cumberland	0	0	0	0	0	0	0	0	0	0	11
Frederick	0	0	0	0	0	0	0	0	0	0	------
District of Columbia:											
Washington	9	6	0	0	0	10	1	0	0	23	145
Virginia:											
Lynchburg	0	0	0	0	0	0	0	1	0	0	18
Norfolk	0	5	0	0	0	0	0	1	0	7	------
Richmond	1	2	0	0	0	5	2	0	0	0	45
Roanoke	0	1	0	0	0	2	0	0	0	4	12
West Virginia:											
Charleston	0	0	0	0	0	2	0	0	0	7	14
Wheeling	1	0	0	0	0	0	0	0	0	2	14
North Carolina:											
Raleigh	0	1	0	0	0	2	0	0	0	11	18
Wilmington	0	0	0	0	0	2	0	0	0	0	12
Winston-Salem	0	0	0	0	0	2	1	0	0	24	17
South Carolina:											
Charleston	0	0	0	0	0	3	1	1	0	0	30
Columbia	0	------	0	------	------	------	1	------	------	------	------
Greenville	0	0	0	0	0	0	1	0	0	22	------
Georgia:											
Atlanta	3	6	1	0	0	7	0	0	1	8	113
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	0	0	0	0	0	1	1	2	1	30
Florida:											
Miami	0	0	0	0	0	3	0	0	0	1	23
Tampa	0	0	0	0	0	0	0	0	1	2	22
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	5	0	1	0	1	0	0	0	0	25
Tennessee:											
Memphis	2	1	0	3	0	7	4	5	0	39	97
Nashville	0	0	0	0	0	2	3	1	0	2	65
Alabama:											
Birmingham	1	2	1	0	0	2	2	1	0	4	78
Mobile	0	0	0	0	0	1	1	0	0	0	28
Montgomery	0	0	0	0	------	------	1	0	------	0	------

City reports for week ended July 4, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	-------	-------	0	3	-------	6	-------
Little Rock	0	0	0	0	0	0	1	0	0	0	2
Louisiana:											
New Orleans	3	3	0	5	0	16	3	2	3	4	175
Shreveport	0	0	0	0	0	5	0	4	0	4	35
Oklahoma:											
Muskogee	0	0	1	0	0	0	0	0	0	0	-------
Oklahoma City	1	2	1	2	0	0	1	4	0	8	33
Texas:											
Dallas	2	8	1	0	0	4	2	2	0	30	53
Fort Worth	1	1	1	5	0	1	1	2	0	11	29
Galveston	0	0	0	0	0	1	0	0	0	0	20
Houston	2	1	0	1	0	2	1	10	0	1	63
San Antonio	1	0	1	1	0	5	1	0	0	1	62
MOUNTAIN											
Montana:											
Billings	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Great Falls	0	0	0	0	0	0	0	2	0	5	7
Helena	0	0	0	0	0	0	0	0	0	0	4
Missoula	0	0	0	0	0	0	0	0	0	0	6
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	6
Colorado:											
Denver	6	2	0	0	0	4	0	0	0	31	69
Pueblo	1	1	0	0	0	2	0	2	0	7	9
New Mexico:											
Albuquerque	0	0	0	0	0	6	0	0	1	1	12
Arizona:											
Phoenix	0	0	0	0	0	1	0	1	0	0	-------
Utah:											
Salt Lake City	2	1	1	0	0	2	0	0	0	24	28
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4
PACIFIC											
Washington:											
Seattle	4	7	1	0	-------	-------	1	0	-------	41	-------
Spokane	2	0	3	3	-------	-------	0	0	-------	5	-------
Tacoma	1	2	1	3	0	1	0	0	0	0	16
Oregon:											
Portland	4	1	7	6	0	1	0	0	0	1	62
Salem	0	0	1	0	0	0	0	0	0	0	-------
California:											
Los Angeles	21	9	3	0	0	17	2	1	1	17	238
Sacramento	2	1	1	0	0	0	1	1	1	3	19
San Francisco	9	5	0	1	0	7	0	0	0	7	164

City reports for week ended July 4, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	1	0	0	0	0	0
Massachusetts:									
Boston	0	0	0	0	0	0	0	3	0
MIDDLE ATLANTIC									
New York:									
New York City [1]	3	1	0	3	0	0	2	5	1
New Jersey:									
Newark	1	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	1	2	0	0	0	0	0	0	0
Pittsburgh	1	0	0	0	0	0	0	1	1
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	0	1	0
Cleveland	3	2	2	0	0	0	0	0	0
Indiana:									
Indianapolis	1	4	0	0	0	0	0	0	0
South Bend	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago	7	7	0	0	0	0	0	2	0
Michigan:									
Detroit	0	1	3	1	0	0	0	0	0
Grand Rapids	0	0	0	1	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	0	1	0	0	0	0	0
Missouri:									
St. Louis	1	1	0	0	0	0	0	1	0
Kansas:									
Topeka	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	2	0	1	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	1	1	0	0	0
Winston-Salem	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	3	2	0	0	0
Georgia:									
Atlanta	1	1	0	0	2	2	0	0	0
Brunswick	0	0	0	0	0	1	0	0	0
Savannah [1]	0	0	0	0	2	0	0	0	0
Florida:									
Miami	0	0	0	0	0	1	0	0	0
Tampa	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Nashville	1	2	0	0	0	0	0	0	0
Alabama:									
Birmingham	1	0	0	0	1	1	0	0	0
Mobile	0	0	0	0	2	1	0	0	0

[1] Typhus fever: 1 death and 2 cases; 1 death at New York City, N. Y.; 1 case at Savannah, Ga; and 1 case at Fort Worth, Tex.

City reports for week ended July 4, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	1	0	0	1	1	0	0	0
Texas:									
Fort Worth [1]	0	0	0	0	0	1	0	0	0
Houston	1	1	0	0	0	0	0	1	0
MOUNTAIN									
Utah:									
Salt Lake City	0	1	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Tacoma	0	1	0	0	0	0	0	0	0
California:									
Los Angeles	0	0	0	0	0	1	1	2	0
San Francisco	0	0	0	0	2	1	1	0	0

[1] Typhus fever: 1 death and 2 cases; 1 death at New York City, N. Y.; 1 case at Savannah, Ga.; and 1 case at Forth Worth, Tex.

The following tables give the rates per 100,000 population, for 98 cities for the 5-week period ended July 4, 1931, compared with those for a like period ended July, 5 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, May 31 to July 4, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930
98 cities	67	75	54	78	66	66	54	65	[2] 47	57
New England	46	94	41	39	41	39	67	68	96	56
Middle Atlantic	71	68	55	78	65	77	47	62	53	56
East North Central	75	112	64	128	89	92	72	97	[3] 51	91
West North Central	55	52	61	60	52	35	42	72	33	37
South Atlantic	39	54	49	44	43	36	45	26	[4] 12	26
East South Central	12	12	17	12	6	12	23	12	12	36
West South Central	68	38	27	80	85	80	68	35	27	49
Mountain	191	18	35	35	26	9	9	0	[5] 9	9
Pacific	49	65	53	36	71	47	51	54	51	32

MEASLES CASE RATES

	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930
98 cities	1,096	934	876	815	723	642	568	489	[2] 347	270
New England	933	1,506	601	1,546	635	1,144	438	832	402	544
Middle Atlantic	1,101	1,021	838	1,033	663	776	511	607	283	322
East North Central	1,446	512	1,304	453	1,178	377	921	331	[3] 643	168
West North Central	817	420	448	370	331	302	296	269	143	139
South Atlantic	1,473	523	1,102	397	766	411	591	256	[4] 310	180
East South Central	1,140	371	820	161	844	239	588	227	349	126
West South Central	254	115	149	94	88	77	47	17	24	24
Mountain	870	5,665	705	3,410	609	2,687	479	1,454	[5] 215	731
Pacific	511	1,903	580	1,340	302	1,069	302	798	149	451

SCARLET FEVER CASE RATES

	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930
98 cities	310	208	269	188	221	141	168	107	[2] 104	75
New England	414	252	291	218	272	126	238	135	188	73
Middle Atlantic	355	186	318	147	280	112	194	85	135	54
East North Central	422	293	386	301	310	226	240	182	[3] 121	115
West North Central	258	265	168	238	132	151	78	99	31	105
South Atlantic	197	170	122	158	77	106	93	68	[4] 54	62
East South Central	151	96	169	48	93	60	64	54	47	12
West South Central	41	73	88	35	30	98	30	38	41	45
Mountain	104	194	96	132	78	203	96	62	[5] 36	167
Pacific	86	93	80	97	57	73	57	49	47	38

SMALLPOX CASE RATES

	June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930
98 cities	14	20	10	14	7	10	8	13	[2] 6	6
New England	0	0	0	0	5	0	0	0	0	0
Middle Atlantic	0	1	1	0	0	0	1	0	0	0
East North Central	16	8	12	11	5	7	5	10	[3] 8	5
West North Central	42	118	36	54	29	31	19	52	10	14
South Atlantic	18	4	0	8	14	2	12	10	[4] 0	2
East South Central	17	30	23	36	12	18	17	6	23	18
West South Central	41	21	24	21	20	24	30	21	24	0
Mountain	26	62	17	35	0	35	70	53	[5] 0	53
Pacific	33	59	25	49	16	36	6	43	14	32

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Milwaukee, Wis., Columbia, S. C., and Billings, Mont., not included.
[3] Milwaukee, Wis., not included.
[4] Columbia, S. C., not included.
[5] Billings, Mont., not included.

Summary of weekly reports from cities, May 31 to July 4, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

TYPHOID FEVER CASE RATES

	Week ended— June 6, 1931	June 7, 1930	June 13, 1931	June 14, 1930	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930
98 cities	6	8	7	9	9	8	10	13	[2] 10	10
New England	2	5	0	10	10	0	0	10	10	7
Middle Atlantic	5	6	7	8	12	4	4	5	5	5
East North Central	1	4	4	4	4	2	6	10	[3] 3	1
West North Central	10	10	4	6	6	8	10	14	10	8
South Atlantic	20	22	14	16	14	24	16	40	[4] 10	28
East South Central	17	12	17	24	12	48	35	60	41	84
West South Central	10	35	24	17	14	24	54	31	71	45
Mountain	17	0	9	9	0	9	52	35	[5] 36	0
Pacific	4	2	12	16	10	6	14	4	4	4

INFLUENZA DEATH RATES

91 cities	6	5	4	6	7	4	4	3	[2] 3	4
New England	2	0	0	2	7	2	2	0	0	2
Middle Atlantic	5	4	4	5	8	5	2	2	1	4
East North Central	2	4	4	6	5	4	6	2	[3] 1	2
West North Central	6	12	6	15	6	0	0	0	9	0
South Atlantic	14	10	6	2	4	2	6	6	[4] 4	6
East South Central	38	13	13	13	0	13	6	13	19	6
West South Central	10	11	3	25	14	7	7	11	10	14
Mountain	0	9	0	0	9	0	0	0	[5] 9	0
Pacific	7	2	5	5	5	0	2	2	5	7

PNEUMONIA DEATH RATES

91 cities	86	83	75	83	70	72	67	66	[2] 64	54
New England	120	80	60	89	65	75	60	53	36	36
Middle Atlantic	102	100	88	96	72	78	76	71	67	55
East North Central	59	58	60	66	60	52	51	56	[3] 61	40
West North Central	138	132	71	78	106	111	38	87	77	63
South Altantic	77	102	83	80	89	70	103	72	[4] 67	60
East South Central	76	71	145	97	82	117	139	91	82	142
West South Central	86	78	79	100	76	64	90	85	90	78
Mountain	87	115	70	88	78	132	35	79	[5] 72	62
Pacific	48	32	43	57	34	60	41	45	46	52

[2] Milwaukee, Wis., Columbia, S. C., and Billings, Mont., not included.
[3] Milwaukee, Wis., not included.
[4] Columbia, S. C., not included.
[5] Billings, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended June 27, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended June 27, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island[1]					
Nova Scotia		1			
New Brunswick					1
Quebec	2				19
Ontario	1			14	20
Manitoba			1		
Saskatchewan				13	
Alberta	1		1		
British Columbia			1		1
Total	4	1	3	27	41

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended July 4, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended July 4, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	29	Scarlet fever	34
Diphtheria	25	Smallpox	1
Erysipelas	5	Tuberculosis	61
Measles	144	Typhoid fever	9
Mumps	2	Whooping cough	13
Puerperal septicemia	2		

COSTA RICA

San Jose—Communicable diseases—January-April, 1931.—During the months of January, February, March, and April, 1931, certain communicable diseases were reported in San Jose, Costa Rica, as follows:

Disease	January		February		March		April	
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis		2		6		9		7
Diphtheria		5	1	1	2	1	1	
Dysentery (amebic)	75	9	97	12	86	8	83	5
Gastro-enteritis	66	61	64	72	59	94	158	139
Hookworm disease	114	3	104	2	64	7	109	3
Influenza	128	7	214	10	224	26	186	18
Malaria	547	54	469	27	277	40	273	27
Measles	21	22	25	28	19	4	19	10
Paratyphoid fever			1			2	1	
Tuberculosis		35		35		34		38
Typhoid fever	4	2	2	3	2	6	2	8
Whooping cough		1		1	1	1	5	2

GREAT BRITAIN

Scotland—Vital statistics—Quarter ended March 31, 1931.—The Registrar General of Scotland has published the following statistics for the first quarter of the year 1931:

Population (provisional)	4,842,554
Births	23,558
Birth rate per 1,000 population	19.7
Deaths	20,189
Death rate per 1,000 population	16.9
Marriages	7,068
Deaths under 1 year	2,653
Deaths under 1 year per 1,000 births	113
Deaths from—	
Bronchitis	1,758
Broncho-pneumonia	1,203
Cerebrospinal fever	90
Diabetes	166
Diphtheria	118
Dysentery	4
Erysipelas	56
Deaths from—Continued.	
Heart disease	2,550
Influenza	764
Lethargic encephalitis	28
Measles	56
Nephritis (acute)	58
Nephritis (chronic)	376
Pneumonia	941
Poliomyelitis	5
Puerperal sepsis	55
Scarlet fever	41
Syphilis	28
Tetanus	1
Tuberculosis	1,202
Typhoid fever	4
Whooping cough	438

JAMAICA

Communicable diseases—Four weeks ended June 20, 1931.—During the four weeks ended June 20, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the Island of Jamaica outside of Kingston as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis	1	1	Poliomyelitis		2
Chicken pox	1	20	Puerperal fever		2
Diphtheria		2	Scarlet fever	7	12
Dysentery		1	Tuberculosis	49	95
Erysipelas		2	Typhoid fever	16	57
Leprosy		1			

MEXICO

Vera Cruz—Deaths—June 1 to 28, 1931.—During the four weeks ended June 28, 1931, deaths from certain causes were reported in Vera Cruz, Mexico, as follows:

Disease	Deaths	Disease	Deaths
Bronchitis	1	Sprue	1
Cancer	5	Syphilis	5
Cerebrospinal meningitis	3	Tetanus	1
Gastro-enteritis	42	Tuberculosis	15
Hookworm disease	1	Typhoid fever	3
Malaria	3	All other causes	63
Pneumonia	6		
Puerperal septicemia	2	Total	151

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931			May, 1931					June, 1931				July, 1931	
					11	18	25	2	9	16	23	30	6	13	20	27	4	11
Ceylon: Colombo	C			1								1	1					
	D											1	1					
China: Canton	C				1						2				1			
	D										1							
India	C	15,334	11,544	8,968	3,161	3,067	2,668	2,566	3,242	3,013								
	D	8,123	6,131	4,550	1,571	1,550	1,360	1,286	1,806	1,598								
Bombay	C	21			2													
	D	9			1													
Calcutta	C	121	170	436	95	82	62	71	72	89	49	55	94	74	50			
	D	86	112	256	55	51	26	44	39	44	34	32	57	47	26			
Karikal	C		9	12	10	8	1		10		1	1						
	D		8	12	5	8	1		5		1	1						
Madras	C	59	72	20	3	1	4	18	18	23	11		3	6				
	D	47	29	10	5	1	3	5	6	8	2	1		4				
Negapatam	D	3	3															
Rangoon	C											2			2			
	D	1										1			1			
Tuticorin	C	1	1															
Vizagapatam	C															1		
India (French):																		
Chandernagor	C	1	5	7	3	2	1		3		1			1				
	D	1	5	6	3	2			3		1			1				
Pondicherry	C	19	100	100	5	3	5	11	3	8	2	4	1	1	1			
	D	11	34	18	1	3				3		4	1	1	1			
Indo-China (see also table below):																		
Pnompenh	C	4	9		1	1							1					
	D	2	5	1			1		2				1					
Saigon and Cholon	C	6	4	5	2	3	7	15	25	23	31	22	18	16	14	13		
	D	3	4	5		3	6	13	20	18	25	13	9	14	9	9		
Persia: Rafsanjan [1]	C								31	1	4							
	D								12		2							

Philippine Islands:[2]																		
Iloilo	C	2																
	D	2																
Provinces—																		
Capiz	C	59	186	48		3	8	18	11	3		3	4					
	D	47	146	41		3	8	13	11	3		1	4					
Iloilo	C	145	95	7									8	7	5	6	24	3
	D	110	65	4									6	5	6	4	22	3
Masbate	C			21														
	D			9														
Negros, Occidental	C	90	4													2		
	D	56	4													1		
Negros, Oriental	C	1																
	D	1																
Pampanga	C								1									
Siam	C	3	1	10	1	1	1	13	11					1	3			
	D	1		2				4	3					1	1			
Ayudhaya District	C			1														
Bangkok	C	3	2	3	1		1	1	1	1	1					1		
	D	1	1	2			1	1			1					1		
Bismulok Province	C			8														
	D			2														
On vessel:																		
S. S. Arankola, at Rangoon from Calcutta	C											1						
S. S. City of Eastborne, at Calcutta from Cocanada	C												1					
S. S. Tairea, at Penang from Calcutta	C													1				

Place		December, 1930	January, 1931	February, 1931			March, 1931			April, 1931			May, 1931			June, 1931	
				1-10	11-20	21-28	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):																	
Cambodia[3]	C	28	62	71	35	19	14		65					44	40	83	96
Cochin-China[3]	C	8	24	5	5	19	39		33				1	52	75	71	69

[1] From May 11 to 30, 1931, 109 cases of cholera and 57 deaths were reported at Rafsanjan, in Kerman District, Persia.
[2] Figures for Cholera in the Philippines Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13	20	27	July 4, 1931
Algeria:																		
Algiers	C	1	2	1	1													
	D				1													
Bone	C		1											1				
Constantine, vicinity of	C	50	1	1														
	D		1															
Philippeville	C	1																
	D	1																
Argentina:																		
Cordoba Province	C		1	2														
Entre Rios Province—Diamante	C			2														
Jujuy Province—Palpala	C		1	1														
Santa Fe	C			2														
Belgian Congo	C				2										1			
	D				2										1			
British East Africa (see also table below):																		
Tanganyika	C	2		22	8			3	5	17	5	7						
	D	2		4	1			10	11	11	2	8						
Uganda	C	67	25	15	19	8	3	10	14	11	33	31						
	D	67	24	15	19	8	3	9	12	11	26	28						
Ceylon: Colombo	C	9	8	11	8	1	3			1								
	D	9	6	13	7	1	2			1								
Plague-infected rats			2	3	4		1					5						
China: Amoy	C									1								
	D									1								
Dutch East Indies:																		
Batavia and West Java	C	239	180	141	84	19	24	29	11	13	12	14						
	D	238	168	128	80	18	23	20	10	18	12	14						
East Java and Madura	C		4	1	4			1		1								
	D		4	1	4			1		1								
Java and Madura	D	615	427	376	277	58	73	70	42	47	41	46	42					

Egypt:																		
Alexandria	C	3	1	2	1											3	1	1
	D															3	1	1
Plague-infected rats		1	1	1														
Assiout	C	7	26	41	18	5	16	8	3	4	5	8	1	4		5	2	
	D	1	6	11	6		11	4	2	2	4	1					1	
Beni-Suef	C		1					10	2	3		2						
	D		1					3		1		2						
Cairo	C				1													
Deirout	C		21	16					3	7	1		2	3				
	D		4	4					1	2	2			1				
Gharbieh	C		1												1			
	D		1												1			
Girga	C	7	1		86	31	9	4		1	1	5						1
	D	2	1		24	13	3	5	1	1	1							
Kena	C				5			3				1						
	D				2			1				1						
Manfalut	C	23	30	15	17													
	D	5	6	5	3													
Minieh	C		2		3		1			5		1		3				
	D		1		2					2		1		1				
Port Said	C														1	1		1
Hawaii Territory: Hamakua—Plague-infected rats												1						
India	C	3,740	5,335	5,457	9,139	2,503	1,603	1,258	778	431	139							
	D	2,226	3,422	3,661	7,037	1,980	1,377	1,092	750	385	143							
Bassein	C	2	4	1					1			1						1
	D	1	3	1					1			1						1
Bombay	C		1	1	4	4	4	1	2	5		1	1					1
	D		1	1	3	4	4		3	4	1	1						
Plague-infected rats		38	31	32	70	34	43	30	30	26	30	17	21	10	10	10		
Calcutta	C					1	1											
	D					1	1											
Madras Presidency	C	220	312	71	28	3				1	1							
	D	154	182	46	21	2					1							
Rangoon	C	2	2		1	1				1			1		1			
	D	1	1		1	1				1			1		1			
Plague-infected rats		2	4	8	7	1	3			1	1	3	2		3			
Indo-China (see also table below): Pnompenh	C	1	7	1										1		1		
	D	1	7	4	6	2	1	1						1		1		
Iraq:																		
Baghdad	C		5	3	8		5	10	8	7	10	4	2	10	6	1	6	1
	D		4	2	5		2	5	1	3	4	2		1	4	1	3	1
Maudhan	C												2					
Madagascar (see also table below): Tamatave	C	2	9															
Morocco	C	19	13															
	D	8	4															
Nigeria: Lagos	C	5	1			2	2	1										
	D	5	1			2	2	1										
Plague-infected rats		5				3	3											
Peru (see table below).																		
Senegal (see table below).																		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13	20	27	July 4, 1931
Siam	C		4	18	31	1				1			1					
	D		2	14	7	1				1			1					
Bangkok	C	3	8	6	29													
	D	3	8	5	6													
Nagara Rajsima	C	17	9	7	1													
	D	10	10	6														
Syria: Beirut	C	1	1	1														
Tripolitania	C		8	1	1													
	D		3															
Tunisia: Tunis	C	13	1	14	10	5	7		4	7		8	1		8	2	1	
	D			7	4	4	2		2	3					1			
Union of Socialist Soviet Republics:																		
Gouranduz	D		28															
Transcaucasia—Karabakh	C		6															
Union of South Africa:																		
Cape Province	C					2	1											
Orange Free State	C	2	P	1	6	1	1					1	1					
	D	2		1	1	1	1						2					
On vessel: S. S. Marlonga de Thermiotis at Avonmouth	C	1																

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
British East Africa (see also table above):							
Kenya	C	69	21	7	345	221	
Indo-China (see also table above)	C			4	2		2
Madagascar (see also table above):							
Ambositra Province	C	100	92	70	30		
	D	96	88	66	29		
Antsirabe Province	C	66	84	83	48		
	D	57	79	74	47		
Miarinarivo Province	C	28	31	19	6		
	D	26	29	19	6		
Moramanga Province	C	7	7	1			
	D	5	7	1			
Tananarive Province	C	92	145	90	41		
	D	89	139	81	40		

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
Peru	C	29	12				
	D	8	6				
Senegal:							
Baol [1]	C					4	
	D					3	
Dakar [1]	C				2	63	64
	D				1	49	56
Louga [1]	C			14	1	5	
	D			6		2	
Rufisque [1]	C		2			1	2
Thies [1]	C						12
	D						3
Tivaouane [1]	C				4	19	3
	D					11	2

[1] Reports incomplete.

SMALLPOX

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931 11	April 18	April 25	May, 1931 2	May 9	May 16	May 23	May 30	June, 1931 6	June 13	June 20	June 27	July 4, 1931
Algeria:																		
Algiers	C	1	1	1	2		2					1			7	1		
Bone	C		1															
Constantine	C				1					1								
Arabia: Aden	C		1	1														
Belgian Congo	C	79	50								7	10						
Belgium	C			1														
Brazil: Porto Alegre (alastrim)	C		3	7	49	20	19	8	6	2	4	7						
	D			1	1													
British East Africa (see also table below):																		
Tanganyika	C	84	70	91	8						13							
	D	4	5	13	3													
British South Africa: Southern Rhodesia	C	18	13															
Canada:																		
Alberta	C	19	7	1														
British Columbia	C	3	2	8														
Manitoba	C		1	1														
Winnipeg	C	1		1						4								
Nova Scotia	C		1		1													
Ontario	C	17	49	29	9	4		6	7	17	5		3		4	3	14	
Kingston	C	6	1	1				2	3									
North Bay	C	2		1														
Ottawa	C	2	3	1												1		
Sault Ste. Marie	C	1	30	2		3	1				1							
Toronto	C				2		4			1						1		
Quebec	C		2															1
Saskatchewan	C		38	63	58	5	16	3	22	7	15	18	8	7	16	18	13	
Regina	C			1	2			2		2								
Canary Islands: Las Palmas	C				1													
Chile: Chanaral	C												1					
China:																		
Amoy	C				1				2	2	1	1	2	1	2			
	D				1				1	1		1	1	1	1			
Canton	C			3	7	1	2	1				1	2			1		
Chungking	C	2																

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931 11	18	25	May, 1931 2	9	16	23	30	June, 1931 6	13	20	27	July 4, 1931
China—Continued.																		
Foochow	C	P	P	P	P	P			P				P					
Hong Kong	C	1	1	9	2		1	2					1					
	D			3	2			1		1			1					
Manchuria—																		
Harbin	C		1	4	2					1	1		1					
Kwantung—Dairen	C	1			2			1	1	1			1					
Nanking	C	P	P	P	P	P	P	P	P	P	P	P						
Shanghai—																		
Foreigners only	C	14	12	16	6	2	1	2	2	1	4	1	1	2		2		
Including natives	D	11	13	14	10	2	7	4	5	1		3	3	1	5	4	3	
Swatow	D	5	7	13	26	2												
Tientsin	C		1							2								
Chosen (see table below).																		
Colombia: Cali	D									1								
Dutch East Indies:																		
Batavia and West Java	C	4	29	2	1						1	1						
	D	2	2	1														
East Java and Madura	C												1					
Finland	C						1											
France (see table below).																		
Great Britain:																		
England and Wales	C	665	958	745	795	177	163	212	192	186	166	111	107	83	94	62	48	
Bradford	C	1	4	1	2	1		1	4	1	3	1	3			5		
Leeds	C	2			1		1	1		1		1						
London	C	161	140	98	147	51	39	84	53	66	44	37	36	25	50	31	16	
London and Great Towns	C	560	693	683	554	142	126	162	128	139	108	84	72	57	84	49	38	
	D			1		1		1						1				
Sheffield	C		3	32	10	4	2	1										
Stoke-on-Trent	C		1	1														
Greece (see table below).																		

Honduras:																		
Amapala	C			1														
Ocotopeque and Gracias districts	C			P														
Puerto Castilla	C	4	11	3														
Tegucigalpa	C							1										
Tela	C					1												
India	C	5, 623	9, 623	12, 222	11, 791	3, 980	3, 749	3, 458	3, 068	3, 422	2, 836							
	D	1, 381	2, 245	2, 660	2, 261	807	684	690	752	709	572							
Bassein	C												1					
Bombay	C	2	7	6	10	2	2	1	3	3		6	1		2			
	D	2	1	3	4	1			4	1	1	1	1		1			
Calcutta	C	59	143	251	283	101	60	61	65	24	30	19	16	14	19	14		
	D	40	100	188	203	78	42	50	51	18	25	17	15	12	18	11		
Cochin	C	15	29	59	46	10	11	12	6	3								
	D	1		3														
Karachi	C		3	4	4		5		1							2		
	D		2		2											1		
Madras	C	4	10	8	22	12	4	1	2	1	3	3	1			1		
	D			1	3	2	1	1	1		1	5						
Moulmein	C		2															
Negapatam	C					1	1		1							2	1	
Rangoon	C			4	3	2	2	1	6	7	5		1		1	4	1	
	D				1				1	2	1	1	1		1		1	
Vizagapatam	C		1	8	2	2	2	4	2			5	1	2	1		3	
	D			2	1	1		1				1			1		1	
India (French):																		
Chandernagor	C	5	9	12	14	3	1	4	2	3		4						
	D	3	1	1	2	3	1	2	1	3		2						
Karikal	C	3	5	19	3		1	1	2	1	1	1	1	1	2			
	D	2	4	18			1		2	1	1	1	1	1	2			
Pondicherry Province	C	34	45	19	14	3			3	1	2	7	1	3	2	1	1	
	D	32	45	19	14	3	3		3	1	2	7	1	3	2	1	1	
India (Portuguese)	C	4	5	14	8		19	2				3						
	D			3	3		4	2				1						
Indo-China (see also table below):																		
Pnompenh	C	2	1		1							1		2				
	D		1									1						
Saigon and Cholon	C		6	4	8	1					1		1					
	D		4	1	8	1					1							
Iraq:																		
Baghdad	C			9				1	1			1	2		1			
	D												2					
Basra	C												2		1			
Mosul Liwa	C	1	3	5														
	D			1														
Ivory Coast (see table below).																		
Japan:																		
Kobe	C			2														
Taiwan	C		1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931			May, 1931					June, 1931				July 4, 1931
						11	18	25	2	9	16	23	30	6	13	20	27	
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D		1		1				1	1		1			1			1
Mexico City and surrounding territory	C	10		23	33	17	9	11	6	4	10	10	21	5	4	16		
	D	6	1	8	22	4	6	4		4	3	2	2	4	3	6		
Monterrey	C													1				
Torreon	C						1				1					1	2	
	D						2									1	1	
Vera Cruz	C			3	2		1		1	1								
Morocco (see table below).																		
Nicaragua: Porto Cabezas	C	2																
Nigeria: Lagos	C				2													
Panama Canal Zone	C		2															
Poland	C	25		1									3	1	1		1	
Portugal: Lisbon	C	72	103	40	52	8	18	11	19	19	14	16	18	5	17	12	14	
Siam	C	1	4	2				1				3	3					
	D	1											1					
Spain	C	P	P	P	P													
Straits Settlements	C	6	7	2	4	1		9										
	D	3	1	1	1	1	1	3										
Sudan (Anglo-Egyptian)	C	64	11	97	8				3		3		1					
	D	6	7	10	2								1					
Sudan (French) (see table below).																		
Syria (see table below).																		
Tunisia: Tunis	C	17	8		4													
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P		P	P							
Orange Free State	C		P	P	P	P	P	P		P	P	P	P					
Transvaal	C	P	P	P	P													
Upper Volta	C	4		18	3		3			1	2		85	11		1		
	D	2			1								1					

On vessel:																		
S. S. Clan Mactoggart at Suez	C			2														
S. S. Muncaster Castle at Manila from Hong Kong	C	1																
S. S. Matheran at Suez from Calcutta	C		1															
S. S. Clan Buchanan at Suez	C			2														
S. S. Rotterdam at Naples from Venice	C				1													
S. S. Clan McTavish at Manila from Chittagong	C						1											
S. S. Benevue at Sydney from Shanghai	C		1															
S. S. Clan MacBrayne at Cochin	C			1														
S. S. Chilka at Rangoon	C			1														
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C								1									
S. S. Talodi at Suakin	C										1							

Place		December, 1930	January, 1931			February, 1931			March, 1931			April, 1931			May, 1931			June, 1931	
			1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	61	47	48	46	95	46	27	125		139	100				17	41	30	16
Ivory Coast	C	9																	
Sudan (French)	C	139							4		P								
	D	20																	
Syria: Beirut	C			1															1

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen	C		1		11		
	D		1		3		
France	C		4	16	15		
Greece	C	4		4			3

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Mexico (see also table above)	D	1		3		1	1
Morocco	C	25		4	6	7	49
Turkey	C	116	63	37	1		9
	D	9	7	6			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 14, 1930–Jan. 10, 1931	Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	April 18	April 25	May, 1931: 2	May 9	May 16	May 23	May 30	June, 1931: 6	June 13	June 20	June 27	July 4, 1931
Algeria:																		
Algiers	C			2	3			2	1	3		1	3	4	4		1	
Constantine Department	C	6	31	4	3	2		6	1	8	3	5	6	6	3	1	16	
Oran	C		3	1				1					2	2				
Australia, Western	C	3			1					1								
Bulgaria	C	1	13	5	9		26	4			5	8	3	11	10			
	D				2		3				1		3	2				
Chile: Valparaiso	D			1														
China:																		
Canton	C		2		1													
Manchuria—Harbin	C		3	5	3			8										
Shanghai	C		2															
Tientsin	C					1	1											
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C						1								1	1		
Beheira Province	C	1				3	1											
Cairo	C	1	1															
Port Said	C		1															
Eritrea: Asmara	C				1													
Great Britain: Scotland	C		1															
Fife County	C												1					
Glasgow	C		2															
	D		1															
Greece (see table below).																		
Guatemala.[1]																		
Iraq: Baghdad	C			5	2					2								
	D			1						2								
Irish Free State:																		
Cork County—Skibbereen	C														1		1	1
Kerry County—																		
Dingle	C									1								
Listowel	C																1	

Limerick County—																		
Limerick	C																	4
Michelstown	C																	1
Mayo County—Belmullet	C						1											
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D		1															
Mexico City, including municipalities in Federal District	C	12	39	35	216	67	34	38	31	16	27	17	15	7	12	27		
	D	10	34	16	84	18	7	17	14	9	7	7	10	4	4	11		
San Luis Potosi	D			5	5	1	2					1	1					
Morocco	C	8	8	28	7		1		12		13	29			31	42	28	
	D		2	1					1		2	2			2	3	1	
Palestine	C	4	2	3	5	1	2		2	2	1	1			2	3		2
Panama Canal Zone—Balboa	C										1							
Paraguay: Asuncion	D		4	1	1													
Poland	C	63	106	189	287	93	176	140	129	92	81	58	67		48	33		
	D	3	8	19	15	8	7	6	7	6	4	5	3		2	1		
Portugal: Oporto	C		1															
Rumania	C	113	193	152	214	70				63	52	54		42				
	D	5	16	24	16	8				10	5	3		4				
Syria	C										1	3						
Tunisia:																		
Sbeitla, vicinity of	C				20	2			10									
	D				7													
Sfax	C				2													
Tunis	C		16	18	14	2		1	10	12	9	8			64	9		
	D									1	2				4			
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	1	P	P	P		P	P	P	P					
Municipality of East London	C	3	3		P													
Natal	C	P	P	P	1	P	P	P	P	P		P	P					
Orange Free State	C	P	P	P	P	P	P	P			P	P	P					
Transvaal	C	P	P	P	P	P	P	P		P	P	P	P					
Yugoslavia (see table below).																		

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen: Seoul	C	1	1		3	4	
Czechoslovakia	C	24	60	26		5	
Greece	C	10	10	17	8	22	6
	D		2	2	1	3	
Latvia	C			12			

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Lithuania	C	6	26	3	99	34	10
	D	3	3	1	3	5	
Mexico (see also table above)	D	85	66	83			
Turkey	C	2	17	18	15		3
Yugoslavia	C	1	20	12	10	43	14
	D	1	2		1	5	

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended—													
					April, 1931			May, 1931					June, 1931				July, 1931	
					11	18	25	2	9	16	23	30	6	13	20	27	4	11
Brazil:																		
Bahia State	C			2														
Ceara State	C	1		2				2		1			1					
	D	1						2		1								
Minas Geraes State	C			2	1		2	2	1		1							
	D			1			1	1	1									
Rio de Janeiro State	C			1						1	1							
	D		1	2														
Cambucy	C	3	2	1														
	D	3	1															
Friburgo (imported)	C	1																
Padua	C	2	1															
	D	2	1															
Sergipe State	C													1				
British Cameroons: Mamfe	C									3			1					
	D									2								
Gold Coast:																		
Akuse	C																2	
	D																1	
Tamale	C																	2
	D																	2

×

UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

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TYPHUS FEVER

THE RAT FLEA, XENOPSYLLA CHEOPIS, IN EXPERIMENTAL TRANSMISSION

By R. E. Dyer, *Surgeon;* E. T. Ceder, *Assistant Surgeon;* A. Rumreich and L. F. Badger, *Passed Assistant Surgeons, United States Public Health Service*

Epidemiological studies have shown an association of typhus fever in the Southeastern United States with the handling of foodstuffs (1) and intimate association with rats (2).

The importance of the rat flea as a vector of endemic typhus fever in the United States has been shown by the recovery of the virus of this disease from fleas taken from wild rats trapped at typhus fever foci in Baltimore (3). More recently the virus of endemic typhus has also been recovered from fleas taken at a typhus focus in Savannah (4). The Baltimore and Savannah strains of virus have been definitely shown to be identical with the virus of endemic typhus recovered from a human case (4). The recovery of typhus virus from wild rats recently has been reported by Mooser, Castaneda, and Zinsser (5).

Experimental transmission of endemic typhus in the laboratory by means of the rat flea has been attempted. In these experiments one of the species of flea (*Xenopsylla cheopis*) incriminated by our previous work has been used (3).

Metal and glass boxes approximately 24 inches long, 14 inches wide, and 18 inches deep were constructed. The bottoms and corners were made of copper, the sides and ends being of glass. Tops were made of fine copper wire screening stretched over metal frames. A trap door was placed in each top.

White rats were chosen as the experimental animals.

Fleas were procured from rats trapped in Baltimore and identified by hand lens. Approximately 50 of these fleas were placed in glass box X–1. White rats were injected with endemic typhus virus (Baltimore and Savannah flea strains) and placed in the same glass box. Approximately two weeks after the first infected white rat had been placed in box X–1, six fleas were removed from this box, emulsified in normal saline, and injected into two guinea pigs. One of these guinea pigs developed clinical endemic typhus. This strain of virus was carried in guinea pigs and rabbits for three generations and then dropped. Smears from the tunica of one of the guinea pigs showed rickettsia. Two rabbits inoculated with this virus showed the development of agglutinins for *Proteus* X_{19}, type O.

Noninfected white rats and additional infected white rats were then placed in box X–1. After a residence of about two weeks in the box one of the white rats originally noninfected was removed and killed. Six fleas were removed from this rat, emulsified in normal saline, and injected into two guinea pigs. Both animals developed clinical endemic typhus. Two rabbits inoculated with the strain of virus obtained from these fleas developed agglutinins for *Proteus* X_{19}, type O.

The brain and spleen from this originally noninfected white rat were removed and inoculated, separately, into guinea pigs. These animals developed clinical endemic typhus. Two rabbits inoculated with the strain of virus recovered from this rat developed agglutinins for *Proteus* X_{19}, type O.

The fleas remaining in box X–1 were then transferred to a fresh box, X–3. White rats infected with typhus and noninfected white rats were placed in box X–3. About two weeks later one of the white rats, originally noninfected, was removed and killed. Fleas taken from this rat were treated as before, with the same results. The brain and spleen of this rat were injected into guinea pigs, and clinical endemic typhus again followed. This strain also produced agglutinins for *Proteus* X_{19}, type O, in rabbits.

The same experiment was again repeated, using a second originally noninfected rat from box X–3. This again resulted in establishing a strain of virus, in guinea pigs, clinically identical with endemic typhus.

Guinea pigs recovered from infection with an established strain of endemic typhus virus originally derived from a human case, and also guinea pigs recovered from infection with endemic typhus virus isolated from rat fleas caught at typhus foci have been found immune to subsequent inoculaton with the strains of virus recovered from the emulsified fleas removed from boxes X–1 and X–3, and likewise to the strains recovered from brains and spleens of originally noninfected rats from the same boxes.

Careful repeated search of both boxes and rats failed to show the presence of any blood-sucking parasite other than *Xenopsylla cheopis.*

REFERENCES

(1) Maxcy, K. F.: Pub. Health Rep., **44**: 1735, July 19, 1929.

(2) Rumreich, A., Dyer, R. E., and Badger, L. F.: Pub. Health Rep., **46**: 470, Feb. 27, 1931.

(3) Dyer, R. E., Rumreich, A., and Badger, L. F.: Pub. Health Rep., **46**: 334, Feb. 13, 1931.

(4) Dyer, R. E., Rumreich, A., and Badger, L. F.: In press.

(5) Mooser, H., Castaneda, M. R., and Zinsser, H.: Jour. Am. Med. Assn., **97**: 231, July 25, 1931.

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

June 21–July 18, 1931

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized in this report. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Poliomyelitis.—During the period of this report the number of cases of poliomyelitis reported (491) was more than twice the number reported for the preceding 4-week period. The States along the Atlantic coast and the East North Central group seemed to be mostly responsible for the excess incidence. In Massachusetts the cases rose from 8 to 32; in New York from 16 to 105; in Connecticut from 1 to 16 and in North Carolina from 2 to 9. Each of the States in the East North Central group, except Indiana, reported from three to five times more cases than were recorded during the preceding 4-week period.

Part but not all of this increase represents the usual seasonal rise. The total number of cases reported was about 52 per cent of the number reported in the same period of 1930 but was more than twice the number reported for the corresponding period of either 1929 or 1928. The following table affords a comparison by geographic areas with the reports for 1930 and 1929.

TABLE 1.—*Poliomyelitis cases reported in various geographic regions by 4-week periods in 1931 with comparative figures for the same periods in 1929 and 1930*

Geographic division	Four-week period ended—			
	July 18	June 20	May 23	Apr. 25
All regions:				
1931	291	124	87	83
1930	611	189	93	63
1929	132	95	102	66
New England and Middle Atlantic:				
1931	169	30	23	23
1930	37	12	24	15
1929	33	23	24	16
South Atlantic:				
1931	23	14	10	9
1930	30	20	9	13
1929	39	18	23	14
East North Central:				
1931	41	15	14	14
1930	40	15	7	4
1929	11	16	23	19
South Central:				
1931	24	20	14	8
1930	137	36	12	18
1929	20	7	12	5
West North Central:				
1931	12	15	10	9
1930	33	6	2	0
1929	7	12	7	6
Mountain and Pacific:				
1931	22	30	16	20
1930	334	100	39	13
1929	22	19	13	6

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The number of States included for the various diseases are as follows: Typhoid fever, 47; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 45; diphtheria, 47; scarlet fever, 47; influenza, 39 States and New York City. The District of Columbia is counted as a State in these reports.

In 1930 the far West and the Mississippi Valley were the areas chiefly affected. This year the first tendency toward any appreciable increase has appeared in States along the Atlantic coast and the East North Central group, with very little rise in the Western States and Mississippi Valley.

Typhoid fever.—The number of cases of typhoid fever reported for the current period was twice that recorded during the preceding 4-week period. Comparison with previous years shows that the disease was more prevalent than in the corresponding period of either of the two preceding years. The cases totaled 2,303, as compared with 2,092 in 1930 and 2,047 in 1929, i. e., approximately 10 per cent increase in 1931 over each of the two preceding years.

Each geographic area except the Mountain and Pacific groups contributed to the increase. The West North Central group showed an increase of about 42 per cent over last year's figure, and in the other groups the increases ranged from 6 per cent to 17 per cent. The Mountain and Pacific groups recorded a 10 per cent decrease.

Measles.—The number of cases of measles (26,081) reported for the four weeks ended July 18 was only 84 per cent of the number reported for the same period in 1930. It was, however, 10 per cent in excess of the number occurring in 1929.

For the first time this year the incidence of measles in the North Atlantic States fell below the incidence of last year during successive 4-week periods. The decrease (8 per cent) was small, however, compared with the decreases of from 40 to 70 per cent which occurred in other areas. The only exceptions to the decline were the South Atlantic and East North Central groups. In the former group the number of cases was four and five-tenths times that of last year and in the latter the excess was about 40 per cent.

Smallpox.—The incidence of smallpox reached its lowest level for the current year during the 4-week period ended July 18. The number of cases reported was 1,675, which was only 54 per cent of the cases reported for the corresponding period in 1930 and 71 per cent of the figure for 1929. All regions participated in the decline except the New England and Middle Atlantic groups. In Vermont the cases rose from 23 for the preceding 4-week period to 56 during the current period and in New York from 28 to 83 cases. The decreases in the other groups ranged from 24 per cent to 77 per cent.

Scarlet fever.—The number of cases of scarlet fever (6,727) reported during the 4-week period ended July 18 was only 50 per cent of the number reported during the preceding 4-week period. In relation to previous years the incidence was about 12 per cent higher than in the corresponding period of 1930, but was 2 per cent below that of 1929. Sections along the Atlantic coast reported increases over last year. The North Atlantic showing a 45 per cent increase and

the South Atlantic a 12 per cent increase. Most of the other sections showed very considerable decreases.

Meningococcus meningitis.—For the current period there were 244 cases of meningococcus meningitis reported, which was about 30 per cent lower than the figure for the corresponding period of 1930 and 60 per cent below 1929. All areas contributed to the decline. In the South Atlantic States, the only group which has shown any increase during the current year, the cases dropped to 25 per cent of last year's figure. The sharpest decreases were apparent in the South Central (51 per cent) and the Mountain and Pacific groups (62 per cent).

Diphtheria.—The comparison with previous years continued very favorable. The number of cases reported was 2,459, as compared with 3,062 for the corresponding period of last year and 4,430 in 1929 for the corresponding period. From 20 to 35 per cent decreases occurred in the North Atlantic States and the regions around the Great Lakes. In the other groups the figures approximated those of last year for the same period.

Influenza.—For the first time in the current year the incidence of influenza fell below that of the corresponding period of last year. The cases totaled 765, as compared with 856 for the corresponding periods of each of the years 1930 and 1929. With the exception of the East North Central group of States, all of the geographic areas were as low as last year's figure or showed decreases ranging from 21 to 26 per cent.

Mortality, all causes.—The mortality rate for all causes in a group of large cities as reported by the Bureau of the Census, averaged 11.2 per 1,000 for the 4-week period ended July 18, 1931. Last year the average rate for this period was 10.8. The average rate for this period during the four preceding years was 11.4.

COORDINATION IN THE SANITARY CONTROL OF BOTTLED MINERAL WATERS [1]

By W. S. Frisbie, *Chemist in Charge, Office of Cooperation, Food and Drug Administration, U. S. Department of Agriculture*

Over 400 springs or wells in the United States have been commercialized, the water from these sources being bottled and sold for medicinal and table use. Owing to improvements in the quality of municipal water supplies, high freight rates, and a changed attitude on the part of the medical profession toward the efficacy of mineral waters in the treatment of disease, only a small proportion

[1] Presented at the Twenty-ninth Annual Conference of State and Territorial Health Officers with the United States Public Health Service, Washington, D. C., Apr. 30, 1931.

of these 400 springs and wells are active at the present time. Nevertheless, considering the country as a whole, there is a substantial traffic in bottled waters. The traffic in those commodities at the present time is both local and interstate. There are several dozen well-known springs, such as Poland, Mountain Valley, Buffalo, Pluto, etc., from which bottled water is shipped in relatively large quantities to all parts of the United States. There are numerous other springs or wells, however, from which water is shipped only intermittently, chiefly in intrastate traffic, but also sporadically in interstate commerce.

The regulatory control of these bottled waters from the standpoint of their sanitary quality and from the standpoint of the therapeutic claims made for them in the labeling of the interstate package, is vested in the Food and Drug Administration of the United States Department of Agriculture under the general provisions of the Federal food and drugs act. Ever since the act became effective in January, 1907, a portion of the funds and time of the personnel of the Administration has been expended in bringing these products into compliance with the terms of the law.

The elimination of the names of diseases from the labeling of bottled waters through numerous court actions brought under the provisions of the act, will not be referred to here. The phase of the regulatory control which it is desired to bring before you at this time is that governing the sanitary quality of these bottled waters.

The current procedure in the Food and Drug Administration is to purchase from dealers and handlers of bottled waters and from consumers of these products, adequate samples for bacteriological and sanitary chemical analyses. Several hundred such samples are examined annually in our Water and Beverage Laboratory under the direction of Mr. J. W. Sale. Only a small proportion, about 10 or 15 per cent, of these samples is found to be polluted. Additional samples of the waters found to be polluted are collected and examined, and formal action leading to confiscation of polluted shipments and prosecution of the shipper is instituted under the act. The standards which we employ in determining whether or not a water is polluted are essentially the same as those used by the United States Public Health Service in the control of water on interstate carriers. The exact standards that we use and other details of our procedure are fully described in a mimeographed article entitled, "Mineral Waters and Their Salts Under the Federal Food and Drugs Act." The laboratory examination of the samples is supplemented, wherever possible, by inspection of the sources of the supplies; but we have not found it practicable to make as many surveys on as many occasions as would be required to bring about thoroughly acceptable conditions. We are somewhat handicapped in that we have no

sanitary engineers on our staff, which consists of chemists, bacteriologists, microscopists, pharmacologists, medical officers, inspectors, etc.

It has occurred to some of us that a closer coordination between the administration and State health officials who are charged with the sanitary control of public water supplies might prove to be extremely beneficial to all parties concerned. As already stated, the water from many springs and wells is sold and consumed largely within the State in which the sources of supplies are located and is distributed only intermittently in interstate commerce. Under these circumstances the chief responsibility for the sanitary quality of this class of bottled waters rests primarily upon local health authorities. While we have made close contact with the State health officials of a few States, generally speaking we are not informed of the steps which these officials have taken to control the sanitary quality of bottled waters, and presumably the State health officials have not been aware, except perhaps in a very general way, of the control that has been exercised under the provisions of the food and drugs act. It was our thought that if our work could be coordinated more closely, considerable duplication of work would be avoided, with a consequent saving in funds.

With this thought in mind, the writer and Mr. Sale, accompanied by a representative from the United States Public Health Service, visited the State Health Departments of North and South Carolina and Florida. Arrangements were made with the officials of these States for an interchange of information through the medium of the administration's field stations, which are located at strategic points throughout the United States. Specifically, it would be advantageous if this administration should be informed as to what measures have been taken by the State departments in the sanitary control of these springs and wells, particularly with respect to the sanitary inspection and the source of supplies, the conclusions reached by the engineers who have made the inspections, the reports of laboratory analyses, and the recommendations for improvement. It was agreed that this administration would report in detail conditions which we have found as a result of our various inspections and analyses of the waters which have entered interstate commerce, and that we would be prepared, chiefly through the agents of our field stations, to cooperate at all times with the health departments for the purpose of securing bottled waters of high sanitary quality and eliminating so far as possible from the channels of commerce any such waters as may prove a possible menace to health.

If this plan of coöperation appeals in general to other State health officials, it is planned that members of the administration will personally visit every State department which is charged with the sanitary control of mineral springs and that these contacts will be made

as soon as opportunity offers. We shall continue to exercise supervision over the labeling of these bottled waters under that section of the act which interdicts the use of therapeutic claims which are false and fraudulent. We are confident that if such mutual arrangements can be effected, the result will be advantageous to health officials as well as to members of the administration in their common aim—the protection of the consuming public.

The writer is indebted to Mr. J. W. Sale for his assistance in the preparation of this paper.

COURT DECISION RELATING TO PUBLIC HEALTH

Disease developing gradually held not compensable under workmen's compensation act.—(Tennessee Supreme Court; Morrison *v.* Tennessee Consol. Coal Co., 39 S. W. (2d) 272; decided June 10, 1931.) An action was brought against a coal company by an employee of said company to recover damages for personal injuries. The plaintiff's allegations were to the effect that, because of unsuitable tools furnished him and because of improper ventilation of the mine, he had been compelled to breathe large quantities of dust, fumes, and gases, and that, as a result of such inhalation, tuberculosis or other serious infection of his respiratory organs had gradually developed. One of the defenses interposed was that the injury sued on was compensable under the workmen's compensation law, and the question presented to the supreme court on appeal was whether such injury was so compensable.

The compensation statute provided:

"Injury" and "personal injury" shall mean only injury by accident arising out of and in the course of employment, and shall not include a disease in any form except as it shall naturally result from the injury.

The supreme court stated that "If the plaintiff suffers from a disease at all, occupational or otherwise, he has no recourse under the workmen's compensation act, unless that disease naturally results from an accidental injury," and, citing former decisions by it, declared:

An injury, to be regarded as an accidental injury under the compensation act, must be an injury unforeseen, unexpected, and fortuitous. An element of unexpected casualty must be present.

Proceeding the court said:

According to the declaration herein, the disease of the plaintiff came about as a natural result of the inhalation of dust, gases, and fumes present in the mine. Certainly then there is no unforeseen, unexpected, nor fortuitous result involved.

Moreover, we are unable to see anything unforeseen, unexpected, or fortuitous in the cause of plaintiff's injuries, as that cause is stated in the declaration. * * * No element of casualty appears about the selection of the tools or the preparation of the working place, nor does any element of casualty appear in the operation of such tools by plaintiff, nor in the pursuit of his activities by plaintiff in the particular working place. * * *

The court also pointed out that, in addition to the foregoing, it was quite generally held that, in order for a disease to be referable to an accidental injury under compensation statutes, the inception of the disease must be assignable to a determinate or single occurrence identified in space or time. It cited one of its own decisions in which the last proposition was recognized, and then went on to say:

> If an accidental injury was viewed otherwise, it would be difficult to apply the statutory provision as to notice and indeed difficult to apply the limitation of the time in which an action under the compensation statute must be commenced. Such provisions of the statute indicate that the legislature could not have intended accidental injuries to include diseases which developed "gradually" or "by gradual process," as the plaintiff's troubles herein are alleged to have evolved.

DEATHS DURING WEEK ENDED JULY 18, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended July 18, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended July 18, 1931	Corresponding week, 1930
Policies in force	75, 038, 874	76, 031, 789
Number of death claims	12, 549	12, 065
Death claims per 1,000 policies in force, annual rate	8. 7	8. 3

Deaths [1] from all causes in certain large cities of the United States during the week ended July 18, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended July 18, 1931				Corresponding week, 1930		Death rate [2] for the first 29 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	7, 025	10. 3	598	[4] 47	11. 0	668	12. 8	12. 6
Akron	26	5. 3	2	20	6. 9	4	8. 1	8. 0
Albany [5]	34	13. 7	2	40	12. 7	3	14. 5	15. 5
Atlanta	63	11. 8	8	82	16. 7	19	15. 9	16. 8
White	29		3	48		7		
Colored	34	(6)	5	144	(6)	12	(6)	(6)
Baltimore [5]	177	11. 3	19	64	10. 9	13	15. 3	14. 5
White	135		9	39		7		
Colored	42	(6)	10	156	(6)	6	(6)	(6)
Birmingham	61	11. 8	7	70	18. 3	11	14. 6	14. 5
White	40		5	86		5		
Colored	21	(6)	2	49	(6)	6	(6)	(6)
Boston	176	11. 7	16	46	9. 7	14	15. 0	15. 0
Bridgeport	20	7. 1	2	33	13. 1	3	11. 8	12. 2
Buffalo	126	11. 3	16	65	11. 1	15	14. 0	13. 7
Cambridge	24	11. 0	3	60	6. 0	0	13. 1	12. 8
Camden	31	13. 6	0	0	12. 3	1	15. 2	14. 2
Canton	14	6. 8	0	0	7. 4	4	10. 7	10. 7
Chicago [5]	638	9. 6	39	34	8. 8	34	11. 5	11. 0
Cincinnati	144	16. 4	13	78	13. 6	4	16. 8	16. 0

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended July 18, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended July 18, 1931				Corresponding week, 1930		Death rate for the first 29 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Cleveland	173	9.9	17	49	9.2	15	11.8	11.8
Columbus	60	10.6	2	20	12.7	5	14.5	16.8
Dallas	50	9.6	8		11.3	11	12.0	12.0
White	41		8			10		
Colored	9	(6)	0		(6)	1	(6)	(6)
Dayton	33	8.3	2	28	11.3	7	12.6	10.4
Denver	61	10.9	4	39	14.5	13	14.6	15.1
Des Moines	30	10.8	0	0	11.7	2	11.8	12.4
Detroit	224	7.1	28	45	8.6	31	9.0	10.0
Duluth	22	11.3	2	49	8.7	3	11.0	11.7
El Paso	21	10.4	6		15.2	11	17.0	18.5
Erie	21	9.3	2	37	8.1	3	11.0	11.6
Fall River [5, 7]	12	5.4	1	23	9.0	1	12.4	13.0
Fort Worth	41	12.8	2		7.3	3	11.5	11.5
White	33		2			1		
Colored	8	(6)	0		(6)	2	(6)	(6)
Grand Rapids	26	7.9	2	30	8.0	4	9.6	11.1
Houston	68	11.4	11		12.0	6	11.6	12.8
White	52		9			6		
Colored	16	(6)	2		(6)	0	(6)	(6)
Indianapolis	88	12.4	7	58	12.3	10	14.5	15.0
White	74		4	38		6		
Colored	14	(6)	3	201	(6)	4	(6)	(6)
Jersey City	56	9.2	4	36	10.4	6	12.3	12.1
Kansas City, Kans.	18	7.6	1	21	10.7	0	13.8	11.5
White	14		1	25		0		
Colored	4	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo.	94	12.0	7	53	14.2	9	14.2	13.6
Knoxville	25	11.9	4	85	10.8	5	13.4	14.5
White	21		3	71		4		
Colored	4	(6)	1	204	(6)	1	(6)	(6)
Long Beach	21	7.2	2	48	12.3	6	10.2	10.0
Los Angeles	277	11.0	17	49	13.2	27	11.2	11.5
Louisville	79	13.4	2	17	11.3	4	15.2	13.9
White	59		0	0		4		
Colored	20	(6)	2	133	(6)	0	(6)	(6)
Lowell [7]	8	4.1	1	25	10.4	4	13.3	14.4
Lynn	18	9.1	3	78	8.1	1	10.5	11.3
Memphis	79	15.9	12	127	28.3	10	17.1	18.3
White	42		7	117		3		
Colored	37	(6)	5	145	(6)	7	(6)	(6)
Miami	19	8.8	1	25	10.8	3	12.6	11.8
White	12		1	35		1		
Colored	7	(6)	0	0	(6)	2	(6)	(6)
Milwaukee	98	8.7	12	52	7.8	4	10.0	10.2
Minneapolis	115	12.7	7	45	10.6	4	12.1	11.0
Nashville	43	14.4	3	45	17.9	5	17.4	16.9
White	23		0	0		3		
Colored	20	(6)	3	177	(6)	2	(6)	(6)
New Bedford [7]	27	12.5	2	53	8.3	1	13.2	11.9
New Haven	36	11.5	2	38	9.0	3	12.5	13.9
New Orleans	137	15.3	16	88	14.5	10	17.8	18.5
White	86		10	83		6		
Colored	51	(6)	6	98	(6)	4	(6)	(6)
New York	1,273	9.4	102	43	9.1	121	12.0	11.6
Bronx Borough	180	7.1	13	29	7.1	12	8.8	8.3
Brooklyn Borough	426	8.5	31	33	7.7	37	11.1	10.6
Manhattan Borough	492	14.1	48	82	13.8	55	18.3	17.2
Queens Borough	134	6.1	8	22	6.3	15	7.7	7.5
Richmond Borough	41	13.1	2	36	13.4	2	14.2	14.9
Newark, N. J.	78	9.1	9	47	9.2	8	12.5	13.0
Oakland	54	9.6	7	89	10.0	2	10.9	11.4
Oklahoma City	48	12.7	6	83	10.0	10	11.7	10.6
Omaha	41	9.9	3	34	20.4	6	14.5	14.1
Paterson	19	7.1	1	17	7.9	2	14.2	13.1
Peoria	27	13.0	6	158	11.8	0	13.5	13.0
Philadelphia	392	10.4	29	42	10.2	36	14.2	13.1
Pittsburgh	154	11.9	18	62	11.5	15	15.8	14.6
Portland, Oreg.	52	8.8	3	36	12.6	5	12.0	13.0

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended July 18, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended July 18, 1931				Corresponding week, 1930		Death rate [2] for the first 29 weeks	
	Total eaths	Death rate [1]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Providence	42	8.6	3	28	11.1	5	13.6	14.1
Richmond	51	14.4	8	117	11.1	3	16.4	15.5
White	36		7	153		0		
Colored	15	(6)	1	43	(6)	3	(6)	(6)
Rochester	65	10.2	5	46	9.8	6	12.8	12.1
St. Louis	220	13.9	14	47	28.0	28	16.6	15.0
St. Paul	59	11.1	6	62	10.3	2	11.6	10.8
Salt Lake City [5]	30	10.9	4	60	10.7	3	12.7	13.3
San Antonio	47	10.2	5		12.7	9	15.7	18.2
San Diego	28	9.3	1	20	15.3	2	14.3	14.8
San Francisco	159	12.8	6	40	13.9	5	13.4	13.4
Schenectady	26	14.1	2	59	12.0	2	10.8	11.8
Seattle	68	9.5	1	9	9.1	4	11.9	11.3
Somerville	12	5.9	1	37	5.5	1	10.0	10.6
South Bend	13	6.3	0	0	9.4	2	8.6	9.5
Spokane	22	9.9	1	26	12.6	1	12.7	13.0
Springfield, Mass	24	8.2	4	61	10.4	1	12.6	13.1
Syracuse	37	9.1	5	59	7.4	3	12.2	12.3
Tacoma	17	8.2	2	51	7.3	2	12.9	12.8
Toledo	64	11.3	5	46	8.8	8	12.6	13.2
Trenton	30	12.6	4	70	10.6	3	17.6	17.1
Utica	22	11.2	0	0	15.9	2	14.8	15.9
Washington, D. C	124	13.1	14	78	12.7	9	16.6	15.7
White	72		8	65		6		
Colored	52	(6)	6	103	(6)	3	(6)	(6)
Waterbury	16	8.3	3	90	9.9	2	10.2	10.5
Wilmington, Del.[7]	13	6.4	0	0	12.2	1	14.8	14.9
Worcester	28	7.4	0	0	9.9	2	13.1	13.8
Yonkers	17	6.4	2	52	6.5	3	9.2	8.4
Youngstown	39	11.8	1	14	8.9	2	11.0	10.5

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended July 25, 1931, and July 26, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 25, 1931, and July 26, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930
New England States:								
Maine		4		1	11	6	0	0
New Hampshire		1				5	0	0
Vermont					21	1	0	0
Massachusetts	36	23	2		135	153	1	1
Rhode Island	1	1			67	10	0	0
Connecticut	9	6			55	8	0	2
Middle Atlantic States:								
New York	78	63	[1] 3		531	360	9	8
New Jersey	20	52			120	172	4	5
Pennsylvania	46	69			320	269	5	6
East North Central States:								
Ohio	15	17	5	7	74	73	1	8
Indiana	12	4	4	2	25	13	2	5
Illinois	61	64	148	2	240	56	8	8
Michigan	28	67		2	33	98	2	5
Wisconsin	9	15	2	4	130	112	2	2
West North Central States:								
Minnesota	5	16	1		22	11	2	1
Iowa	5	4			6	8	0	0
Missouri	11	11			26	21	1	0
North Dakota		4			9	6	0	1
South Dakota	2	1			1	12	0	0
Nebraska	3	6			2	4	1	0
Kansas	10	6	1		33	38	1	3
South Atlantic States:								
Delaware		1			10	5	0	0
Maryland [2] [3]	7	13	1	2	33	8	2	2
District of Columbia	5	8				13	1	0
West Virginia	3	5		10	48	17	1	1
North Carolina	11	27		2	85	10	0	0
South Carolina	8	8	42	68	48		0	0
Georgia [3]	3	5	8	13	9	37	0	1
Florida [3]	4	4			10	5	0	0
East South Central States:								
Kentucky					80		0	2
Tennessee	2	2	2	3	4	3	2	1
Alabama	6	10		3	27	33	3	0
Mississippi	6	9					5	1

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 8 cases; 2 cases in Maryland; 4 cases in Georgia; and 2 cases in Florida.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 25, 1931, and July 26, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930
West South Central States:								
Arkansas	3	1		5	1		1	1
Louisiana	14	6	17	6	1	5	1	1
Oklahoma [4]	13	6	9	2	4	7	0	1
Texas	12	2		10	1	28	1	0
Mountain States:								
Montana	2				11	7	0	0
Idaho					2	5	0	0
Wyoming		1			1	16	0	0
Colorado	5	8			3	23	0	0
New Mexico		2			1	10	0	0
Arizona	2	1	1			18	0	1
Utah [2]					7	7	1	1
Pacific States:								
Washington	4	4			14	63	0	2
Oregon	4	4	4	4	2	29	0	0
California	21	26	14	11	148	181	2	4

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930
New England States:								
Maine	1	0	9	16	0	0	0	2
New Hampshire	0	0	1	0	0	0	0	0
Vermont	0	0	7	1	1	0	0	0
Massachusetts	16	6	120	50	0	0	8	2
Rhode Island	0	0	6	6	0	0	0	0
Connecticut	11	4	9	10	0	0	1	2
Middle Atlantic States:								
New York	204	15	113	93	6	4	16	25
New Jersey	14	0	52	20	0	0	4	6
Pennsylvania	7	5	113	80	0	0	24	25
East North Central States:								
Ohio	1	3	43	55	9	37	15	27
Indiana	0	0	17	20	11	40	7	6
Illinois	12	6	104	72	43	38	17	32
Michigan	9	0	87	51	6	34	8	10
Wisconsin	6	0	25	36	1		6	3
West North Central States:								
Minnesota	8	16	20	16	0	2	2	5
Iowa	1	1	8	2	10	21	6	1
Missouri	0	0	16	9	3	25	23	13
North Dakota	0	1	0	10	14	9	0	1
South Dakota	0	1	3	3	1	10	6	1
Nebraska	0	0	4	4	5	18	0	17
Kansas	3	7	12	23	16	20	13	16
South Atlantic States:								
Delaware	0	0	5	5	0	0	0	0
Maryland [2, 3]	1	1	12	6	1	0	16	25
District of Columbia	0	0	2	2	0	0	4	1
West Virginia	1	1	4	23	3	3	16	28
North Carolina	2	3	23	22	0	4	64	56
South Carolina	2	2	0	2	0	0	72	70
Georgia [3]	0	0	13	10	2	0	80	73
Florida [3]	0	0	1	2	0	2	19	0
East South Central States:								
Kentucky	0	0	17	5	1	11	25	39
Tennessee	1	0	8	13	4	3	41	50
Alabama	1	2	8	9	4	0	30	36
Mississippi	0	4	2	2	6	1	42	58
West South Central States:								
Arkansas	0	7	2	2	1	4	17	30
Louisiana	1	27	9	9	1	6	48	52
Oklahoma [4]	2	13	9	14	10	42	28	52
Texas	1	2	5	6	18	8	43	20

[2] Week ended Friday.
[3] Typhus fever: 1931, 8 cases; 2 cases in Maryland; 4 cases in Georgia; and 2 cases in Florida.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 25, 1931, and July 26, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930	Week ended July 25, 1931	Week ended July 26, 1930
Mountain States:								
Montana	1	0	3	3	2	0	2	1
Idaho	0	0	8	0	1	1	0	2
Wyoming	0	0	1	2	1	2	0	0
Colorado	0	1	3	8	0	2	7	1
New Mexico	0	1	0	2	0	6	11	3
Arizona	0	3	0	3	0	1	6	4
Utah [1]	0	0	0	2	0	0	0	1
Pacific States:								
Washington	2	0	6	13	17	21	6	4
Oregon	0	1	10	8	1	5	3	4
California	4	89	33	44	4	6	20	32

[1] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of monthly State reports is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June, 1931										
Alabama	11	32	29	226	241	314	4	89	46	69
Illinois	41	451	26	26	6,290	--------	5	1,465	246	82
Louisiana	5	87	42	46	15	271	4	49	75	104
Maryland	6	55	14	2	1,868	2	0	152	1	29
Michigan	21	149	11	1	1,366	--------	9	1,634	82	22
Missouri	12	79	2	23	636	--------	3	382	181	35
New Mexico	--------	25	--------	14	180	2	0	18	1	12
North Carolina	10	56	14	--------	2,307	595	3	98	6	94
Oklahoma [1]	1	29	56	205	58	144	2	39	196	50
Oregon	--------	14	35	--------	160	--------	0	47	52	12
Wisconsin	5	34	45	--------	2,626	--------	2	283	38	8

[1] Exclusive of Oklahoma City and Tulsa.

June, 1931

	Cases
Actinomycosis:	
Illinois	1
Anthrax:	
Louisiana	1
Chicken pox:	
Alabama	57
Illinois	1,447
Louisiana	24
Maryland	219
Michigan	1,399
Missouri	170
New Mexico	77
North Carolina	193
Oklahoma [1]	63
Oregon	147
Wisconsin	1,397
Conjunctivitis:	
New Mexico	2
Diarrhea:	
Maryland	17
Dysentery:	
Illinois	23
Illinois (amebic)	1
Illinois (bacillary)	1
Louisiana	3
Maryland	10
Oklahoma [1]	14
German measles:	
Illinois	129
Maryland	107
North Carolina	299
Wisconsin	620
Hookworm disease:	
Louisiana	16
Impetigo contagiosa:	
Maryland	9
Oregon	19
Lead poisoning:	
Illinois	4
Lethargic encephalitis:	
Alabama	4
Illinois	5
Louisiana	4
Maryland	1
Michigan	3
New Mexico	1
Mumps:	
Alabama	59
Illinois	747
Louisiana	12
Maryland	201
Michigan	658
Missouri	86
New Mexico	23
Oklahoma [1]	7
Oregon	128
Wisconsin	2,048
Ophthalmia neonatorum:	
Illinois	15
Maryland	2
Missouri	3
North Carolina	1
Oklahoma [1]	1
Paratyphoid fever:	
Illinois	5
North Carolina	4

	Cases
Puerperal septicemia:	
Illinois	7
Rabies in animals:	
Illinois	21
Louisiana	10
Maryland	4
Missouri	7
Rocky Mountain spotted or tick fever:	
Maryland	6
Oregon	6
Scabies:	
Oregon	4
Septic sore throat:	
Illinois	4
Louisiana	1
Maryland	3
Michigan	30
Missouri	1
North Carolina	5
Oklahoma [1]	10
Oregon	6
Tetanus:	
Illinois	5
Louisiana	5
Missouri	1
Oklahoma [1]	1
Trachoma:	
Illinois	3
Missouri	83
Oklahoma [1]	20
Trench mouth:	
Oklahoma [1]	1
Tularaemia:	
Louisiana	1
Missouri	5
Typhus fever:	
Alabama	4
Maryland	5
North Carolina	1
Undulant fever:	
Alabama	1
Illinois	5
Louisiana	3
Maryland	7
Michigan	1
Missouri	24
New Mexico	1
Oregon	1
Wisconsin	3
Vincent's angina:	
Maryland	14
Oregon	12
Whooping cough:	
Alabama	90
Illinois	957
Louisiana	21
Maryland	352
Michigan	1,286
Missouri	324
New Mexico	54
North Carolina	1,091
Oklahoma [1]	53
Oregon	95
Wisconsin	471

[1] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,965,000. The estimated population of the 89 cities reporting deaths is more than 31,420,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended July 18, 1931, and July 19, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	568	637	
96 cities	268	287	479
Measles:			
45 States	3,629	2,958	
96 cities	1,159	911	
Meningococcus meningitis:			
46 States	49	90	
96 cities	30	30	
Poliomyelitis:			
46 States	116	196	
Scarlet fever:			
46 States	1,141	822	
96 cities	435	323	397
Smallpox:			
46 States	217	497	
96 cities	22	38	23
Typhoid fever:			
46 States	755	787	
96 cities	84	98	84
Deaths reported			
Influenza and pneumonia:			
89 cities	294	270	
Smallpox:			
89 cities	0	0	

City reports for week ended July 18, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	1	0	0		0	0	1	0
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	1
Burlington	0	0	0		0	0	1	0
Massachusetts:								
Boston	22	21	22	2	0	32	8	8
Fall River	1	2	0		0	18	2	1
Springfield	1	1	1		0	6	7	1
Worcester	1	0	0		0	3	6	2
Rhode Island:								
Pawtucket	0	1	0		0	0	0	0
Providence	0	3	4		0	46	8	3
Connecticut:								
Bridgeport	1	2	0		0	16	0	2
Hartford	3	2	0		0	0	0	2
New Haven	1	1	0		0	11	0	1
MIDDLE ATLANTIC								
New York:								
Buffalo	4	7	3		0	18	10	8
New York	83	148	60	1	1	166	34	83
Rochester	1	3	3	1	0	64	4	3
Syracuse	2	1	0		0	9	0	0
New Jersey:								
Camden	1	3	1		0	2	0	1
Newark		9						
Trenton	2	1	0		0	12	6	0
Pennsylvania:								
Philadelphia	21	35	9	3	0	33	10	28
Pittsburgh	12	12	3		0	14	28	13
Reading	2	1	0		0	0	3	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	3	2		1	12	6	3
Cleveland	24	17	3		0	113	67	8
Columbus	1	2	1		0	5	1	4
Toledo	6	0	3		1	12	1	1
Indiana:								
Fort Wayne	1	1	1		0	0	0	1
Indianapolis	1	1	3		0	4	4	6
South Bend	0	0	0		0	1	0	0
Terre Haute	0	0	0		0	2	0	1
Illinois:								
Chicago	33	62	48		3	227	12	15
Springfield	2	0	0		0	0	2	0
Michigan:								
Detroit	16	28	21		1	11	4	7
Flint	3	1	0		0	0	3	0
Grand Rapids	0	0	0		0	28	0	1

City reports for week ended July 18, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	1	1	0		0	0	17	0
Madison	12	0	0			0	18	
Milwaukee	33	8	3	1	1	118	56	2
Racine		1						
Superior	1	0	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0		1	0	0	2
Minneapolis	12	8	2		0	12	4	4
St. Paul	4	5	0		0	6	1	4
Iowa:								
Davenport	0	2	0			0	0	
Des Moines	0	2	0			0	0	
Sioux City	0	0	2			0	1	
Waterloo	0	0	0			2	2	
Missouri:								
Kansas City	0	1	2		0	4	1	4
St. Joseph	0	0	1		0	7	0	2
St. Louis	0	17	9			0	7	4
North Dakota:								
Fargo	0	0	0		0	1	0	0
Grand Forks	0	0	0			0	0	
Nebraska:								
Omaha	0	2	0		0	0	13	2
Kansas:								
Topeka	1	1	0		0	0	21	1
Wichita	5	0	0		0	0	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	0	0		0	4	0	1
Maryland:								
Baltimore	8	10	5		0	22	9	8
Cumberland	3	0	0		0	0	0	1
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	4	5	5		0	8	0	4
Virginia:								
Lynchburg	0	0	0		0	1	0	0
Norfolk	0	0	1		0	1	0	2
Richmond	0	1	0		1	2	0	2
Roanoke	0	0	0		0	1	0	0
West Virginia:								
Charleston	1	0	0		0	0	0	1
Wheeling	0	0	0		0	5	0	0
North Carolina:								
Raleigh	0	0	0		0	3	0	0
Wilmington	0	0	0		0	0	0	0
Winston-Salem	2	0	0		0	8	8	0
South Carolina:								
Charleston	0	0	0		0	0	0	0
Columbia	0	0	0		1	0	0	3
Georgia:								
Atlanta	0	1	0		0	0	0	0
Brunswick	0	0	0		0	0	0	0
Savannah	0	0	1	3	0	0	2	0
Florida:								
Miami	1	0	3		0	6	0	0
Tampa	0	0	1		0	0	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	0	0	2
Tennessee:								
Memphis	0	1	1		0	18	2	4
Nashville	0	0	0		0	1	1	0
Alabama:								
Birmingham	0	1	0	2	0	0	0	1
Mobile	0	0	4		0	0	0	0
Montgomery	1	0	0			1	0	

City reports for week ended July 18, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			0	0	
Little Rock	0	0	0		0	2	0	0
Louisiana:								
New Orleans	0	5	6		0	0	0	6
Shreveport	0	0	0		0	1	0	1
Oklahoma:								
Muskogee	0	1	0		0	0	0	0
Oklahoma City	0	1	1		0	0	1	3
Texas:								
Dallas	0	2	4		0	0	0	0
Fort Worth	1	0	0		0	1	0	2
Galveston	0	0	0		0	0	0	1
Houston	0	2	3		0	2	1	3
San Antonio	0	1	1		1	0	0	2
MOUNTAIN								
Montana:								
Billings	2	0	0		0	7	0	0
Great Falls	5	0	0		0	0	0	0
Helena	0	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	1
Idaho:								
Boise	0	0	0		0	2	0	1
Colorado:								
Denver	3	7	7		0	4	10	2
Pueblo	2	0	0		0	0	0	0
New Mexico:								
Albuquerque	0	0	0		0	1	0	0
Arizona:								
Phoenix	0	0	0		0	0	0	0
Utah:								
Salt Lake City	4	2	0		0	1	7	0
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	21	2	0			3	5	
Spokane	2	1	1			2	0	
Tacoma	3	2	0		0	0	1	1
Oregon:								
Portland	4	6	0		0	1	7	0
Salem	2	0	2		0	0	7	0
California:								
Los Angeles	14	23	21	4	0	24	8	5
Sacramento	1	2	1		0	15	1	0
San Francisco	9	8	3		0	19	2	4

City reports for week ended July 18, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
NEW ENGLAND											
Maine:											
Portland	1	0	0	0	0	0	0	0	0	0	17
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	8
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	4	2
Burlington	0	0	1	4	0	0	0	0	0	4	8
Massachusetts:											
Boston	26	20	0	0	0	7	2	3	0	29	176
Fall River	1	5	0	0	0	1	1	1	0	0	12
Springfield	2	10	0	0	0	0	0	0	0	1	24
Worcester	3	23	0	0	0	4	1	1	0	14	28
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	8
Providence	3	2	0	0	0	1	0	0	0	2	42
Connecticut:											
Bridgeport	2	0	0	0	0	0	0	0	0	3	20
Hartford	1	1	0	0	0	1	0	0	0	7	34
New Haven	0	1	0	0	0	0	0	0	0	3	36
MIDDLE ATLANTIC											
New York:											
Buffalo	10	21	0	0	0	6	0	0	0	27	125
New York	57	44	1	0	0	103	15	10	0	241	1,273
Rochester	3	7	0	0	0	2	1	0	0	4	60
Syracuse	3	7	0	0	0	0	0	0	0	34	37
New Jersey:											
Camden	0	2	0	0	0	2	0	1	2	4	81
Newark	7	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Trenton	1	4	0	0	0	3	1	1	0	5	30
Pennsylvania:											
Philadelphia	30	32	0	0	0	30	4	4	1	68	392
Pittsburgh	13	23	0	1	0	10	2	0	0	36	154
Reading	1	0	0	0	0	2	0	0	0	2	24
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	5	5	1	0	0	14	1	0	0	7	144
Cleveland	16	14	0	0	0	17	1	2	0	69	170
Columbus	2	1	0	1	0	5	1	0	0	0	60
Toledo	4	5	3	0	0	3	0	2	0	30	64
Indiana:											
Fort Wayne	0	1	1	0	0	1	0	1	0	0	26
Indianapolis	3	3	3	2	0	9	1	0	0	53	-------
South Bend	0	1	0	0	0	0	1	0	0	0	13
Terre Haute	1	0	0	0	0	3	0	0	0	1	21
Illinois:											
Chicago	49	77	2	0	0	42	3	4	0	121	638
Springfield	1	1	0	0	0	0	0	0	0	4	25
Michigan:											
Detroit	37	44	1	2	0	22	3	0	0	184	224
Flint	5	9	0	0	0	0	0	1	0	0	17
Grand Rapids	4	1	0	0	0	0	0	0	0	14	26
Wisconsin:											
Kenosha	1	0	0	0	0	1	0	0	0	2	8
Madison	1	0	0	1	-------	-------	0	0	-------	1	-------
Milwaukee	9	13	0	0	0	4	0	1	0	70	98
Racine	2	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Superior	1	1	1	1	0	1	0	0	0	3	12
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	0	0	0	0	1	0	0	0	0	22
Minneapolis	13	5	0	0	0	0	0	0	0	6	115
St. Paul	8	3	0	1	0	2	0	1	0	20	61
Iowa:											
Davenport	0	1	0	3	-------	-------	0	0	-------	0	-------
Des Moines	2	1	0	0	-------	-------	0	0	-------	0	30
Sioux City	1	2	1	0	-------	-------	0	0	-------	10	-------
Waterloo	0	0	0	0	-------	-------	0	0	-------	1	-------

City reports for week ended July 18, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
WEST NORTH CENTRAL—con.											
Missouri:											
Kansas City	3	0	0	0	0	5	1	0	1	11	94
St. Joseph	0	1	0	0	0	0	0	0	0	0	39
St. Louis	9	9	0	0	0	15	3	0	1	87	220
North Dakota:											
Fargo	0	0	0	0	0	0	0	0	0	4	9
Grand Forks	1	0	0	0	--------	--------	0	0	--------	0	--------
Nebraska:											
Omaha	1	2	1	1	0	1	0	0	0	1	41
Kansas:											
Topeka	0	0	0	0	0	0	0	0	0	11	14
Wichita	1	0	1	0	0	0	0	0	0	6	27
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	2	0	0	0	1	0	0	0	3	13
Maryland:											
Baltimore	10	3	0	0	0	11	4	3	0	91	177
Cumberland	0	0	0	0	0	0	0	0	0	0	14
Frederick	0	0	0	0	0	1	0	0	0	0	4
District of Col.:											
Washington	6	5	0	0	0	15	2	0	0	52	124
Virginia:											
Lynchburg	1	0	0	0	0	0	0	2	0	3	17
Norfolk	1	0	0	0	0	0	1	1	0	0	--------
Richmond	1	1	0	0	0	2	1	1	0	0	56
Roanoke	0	1	0	0	0	4	0	0	0	6	16
West Virginia:											
Charleston	0	0	0	0	0	0	1	0	0	27	17
Wheeling	1	0	0	0	0	1	0	3	0	9	20
North Carolina:											
Raleigh	0	0	0	0	0	2	0	0	0	4	9
Wilmington	0	0	0	0	0	1	0	0	0	6	12
Winston-Salem	0	0	0	0	0	1	0	1	0	5	13
South Carolina:											
Charleston	0	1	0	0	0	2	1	2	0	1	28
Columbia	0	0	0	0	0	2	0	0	3	1	33
Georgia:											
Atlanta	2	4	0	0	0	8	2	6	2	2	63
Brunswick	0	0	0	0	0	0	0	0	0	0	3
Savannah	0	0	0	0	0	2	0	5	1	0	29
Florida:											
Miami	0	1	1	0	0	1	0	0	0	1	19
Tampa	0	0	0	0	0	4	0	1	0	4	22
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	2	0	0	0	1	0	0	0	0	25
Tennessee:											
Memphis	2	0	0	0	0	7	7	2	0	26	79
Nashville	0	2	0	0	0	2	5	4	1	6	43
Alabama:											
Birmingham	2	0	1	0	0	2	3	0	2	6	61
Mobile	0	0	0	0	0	0	0	0	0	0	17
Montgomery	0	0	0	0	--------	--------	0	0	--------	0	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	--------	--------	0	0	--------	1	--------
Little Rock	0	0	0	0	0	1	2	2	0	0	--------
Louisiana:											
New Orleans	3	5	0	0	0	7	4	1	0	2	137
Shreveport	0	0	0	0	0	2	1	2	1	5	34
Oklahoma:											
Muskogee	0	0	0	0	0	0	0	2	1	0	--------
Oklahoma City	2	3	0	0	0	1	2	6	1	0	48
Texas:											
Dallas	2	3	1	1	0	4	2	10	1	15	50
Fort Worth	1	1	1	0	0	0	1	0	1	1	41
Galveston	0	0	0	0	0	0	0	0	0	0	14
Houston	1	0	1	1	0	6	1	1	0	0	68
San Antonio	1	2	0	0	0	6	1	1	0	1	47

City reports for week ended July 18, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	1	0	3	8
Great Falls	1	0	0	0	0	0	0	1	0	0	8
Helena	0	0	0	0	0	0	0	0	0	0	7
Missoula	0	0	0	0	0	1	0	0	0	0	5
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	1	6
Colorado:											
Denver	4	3	0	0	0	7	1	0	0	21	64
Pueblo	0	0	0	0	0	0	0	1	0	0	8
New Mexico:											
Albuquerque	0	0	0	0	0	4	0	0	0	1	8
Arizona:											
Phoenix	0	0	0	0	0	4	0	0	0	0	
Utah:											
Salt Lake City	1	0	1	0	0	2	0	0	0	22	30
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	3	1	1	0			1	0		52	
Spokane	1	0	1	6			0	0		16	
Tacoma	1	2	2	5	0	1	0	0	0	2	17
Oregon:											
Portland	2	0	4	1	0	0	0	0	0	1	52
Salem	0	0	0	0	0	0	0	0	0	0	
California:											
Los Angeles	14	2	2	0	0	23	2	1	0	39	277
Sacramento	1	1	0	0	0	1	0	2	0	0	
San Francisco	7	0	0	0	0	10	1	0	0	5	150

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis: Cases	Poliomyelitis: Deaths
NEW ENGLAND									
New Hampshire:									
Nashua	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	2	0	0	0	1	1	1	16	1
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	2	0
New Haven	0	0	0	0	0	0	0	1	1
MIDDLE ATLANTIC									
New York:									
New York	7	3	1	1	0	0	4	53	11
Pennsylvania:									
Philadelphia	1	1	0	0	0	0	0	0	0
Pittsburgh	1	1	0	0	0	0	0	0	1
EAST NORTH CENTRAL									
Ohio:									
Cleveland	2	1	0	0	0	0	0	0	0
Toledo	1	0	0	0	0	0	0	0	0
Indiana:									
Indianapolis	2	3	0	0	0	0	0	0	0
Illinois:									
Chicago	3	4	0	0	0	0	1	2	1
Michigan:									
Detroit	1	0	0	0	0	0	0	2	0

City reports for week ended July 18, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL—con.									
Wisconsin:									
Madison	0	0	0	0	0	0	0	3	0
Milwaukee	0	1	0	0	0	0	0	1	0
WEST NORTH CENTRAL[1]									
Missouri:									
St. Joseph	1	1	0	0	0	0	0	0	0
St. Louis	3	0	1	1	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	3	1	0	1	0	0	1	0	0
District of Columbia:									
Washington	0	1	0	0	0	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	1	1	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Georgia:									
Atlanta[2]	0	0	0	0	1	0	0	0	0
Savannah[1]	0	0	0	0	7	0	0	0	0
Florida:									
Miami[1]	0	0	0	0	2	0	0	0	0
EAST SOUTH CENTRAL									
Alabama:									
Birmingham	0	1	1	1	2	1	0	0	0
Montgomery	1	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	2	1	0	0	0	0	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas:									
Fort Worth	1	0	0	0	0	0	0	1	0
Galveston	0	0	0	0	0	1	0	0	0
Houston	0	0	0	0	0	1	0	0	0
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	0	1	0
PACIFIC									
Washington:									
Spokane	1	0	0	0	0	0	0	0	0
California:									
Los Angeles	0	0	0	0	0	0	1	1	0
San Francisco	0	0	0	0	1	0	0	0	1

[1] Typhus fever: 5 cases; 1 case at Minneapolis, Minn.; 3 cases at Savannah, Ga.; and 1 case at Miami, Fla.
[2] Dengue: 1 case at Atlanta, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended July 18, 1931, compared with those for a like period ended July 19, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, June 14 to July 18, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930
98 cities	66	66	54	65	[2] 47	57	43	58	[3] 42	48
New England	41	39	67	68	96	56	60	41	65	36
Middle Atlantic	65	77	47	62	53	56	50	49	[4] 37	46
East North Central	89	92	72	97	[5] 51	91	41	86	[6] 50	66
West North Central	52	35	42	72	33	37	31	68	31	39
South Atlantic	43	36	45	26	[7] 12	26	18	32	24	46
East South Central	6	12	23	12	12	36	23	24	29	12
West South Central	85	80	68	35	27	49	61	59	47	85
Mountain	26	9	9	0	[8] 9	9	17	26	61	70
Pacific	71	47	51	54	51	32	41	53	51	32

MEASLES CASE RATES

	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930
98 cities	723	642	568	489	[2] 347	270	316	252	[3] 183	147
New England	635	1,144	438	832	402	544	351	460	317	256
Middle Atlantic	663	776	511	607	283	322	311	305	[4] 148	95
East North Central	1,178	377	921	331	[5] 643	168	527	154	[6] 319	70
West North Central	331	302	296	269	143	139	103	130	61	50
South Atlantic	766	411	591	256	[7] 310	180	259	142	107	122
East South Central	844	239	588	227	349	126	116	179	116	42
West South Central	88	77	47	17	24	24	27	17	17	10
Mountain	609	2,687	479	1,454	[8] 215	731	122	582	122	247
Pacific	302	1,069	362	798	149	451	182	482	123	310

SCARLET FEVER CASE RATES

	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930
98 cities	221	141	168	107	[2] 104	75	79	71	[3] 69	53
New England	272	126	238	135	188	73	142	73	149	65
Middle Atlantic	280	112	194	85	135	54	89	49	[4] 65	35
East North Central	310	226	240	182	[5] 121	115	90	114	[6] 105	86
West North Central	132	151	78	99	31	105	44	85	42	43
South Atlantic	77	106	93	68	[7] 54	62	49	68	34	48
East South Central	93	60	64	54	47	12	52	42	23	18
West South Central	30	98	30	38	41	45	34	35	34	21
Mountain	78	203	96	62	[8] 36	167	52	88	26	79
Pacific	57	73	57	49	47	38	49	43	12	40

SMALLPOX CASE RATES

	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930
98 cities	7	10	8	13	[2] 6	6	2	7	[3] 3	6
New England	5	0	0	0	0	0	2	0	0	0
Middle Atlantic	0	0	1	0	0	0	0	0	[4] 0	0
East North Central	5	7	5	10	[5] 8	5	1	9	[6] 4	10
West North Central	29	31	19	52	10	14	4	10	4	14
South Atlantic	14	2	12	10	[7] 0	2	4	0	0	4
East South Central	12	18	17	6	23	18	6	18	0	0
West South Central	20	24	30	21	24	0	10	7	7	7
Mountain	0	35	70	53	[8] 0	53	0	9	0	18
Pacific	16	36	6	43	14	32	8	36	22	18

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Milwaukee, Wis.; Columbia, S. C.; and Billings, Mont., not included.
[3] Newark, N. J., and Racine, Wis., not included.
[4] Newark, N. J., not included.
[5] Milwaukee, Wis., not included.
[6] Racine, Wis., not included.
[7] Columbia, S. C., not included.
[8] Billings, Mont., not included.

Summary of weekly reports from cities, June 14 to July 18, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930
98 cities	9	8	10	13	[2] 10	10	14	16	[3] 13	16
New England	10	0	0	10	10	7	2	5	12	10
Middle Atlantic	12	4	4	5	5	5	8	10	[4] 7	4
East North Central	4	2	6	10	[5] 3	1	5	6	[6] 6	9
West North Central	6	8	10	14	10	8	19	10	2	23
South Atlantic	14	24	16	40	[7] 10	28	28	60	47	44
East South Central	12	48	35	60	41	84	58	84	35	60
West South Central	14	24	54	31	71	45	81	35	57	59
Mountain	0	9	52	35	[8] 36	0	35	0	26	26
Pacific	10	6	14	4	4	4	6	14	6	16

INFLUENZA DEATH RATES

	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930
91 cities	7	4	4	3	[2] 3	4	3	3	[3] 2	2
New England	7	2	2	0	0	2	2	0	0	0
Middle Atlantic	8	5	2	2	1	4	4	4	[4] 0	3
East North Central	5	4	6	2	[5] 1	2	2	3	[6] 4	2
West North Central	6	0	0	0	9	0	0	6	3	0
South Atlantic	4	2	6	6	[7] 4	6	4	2	4	0
East South Central	0	13	6	13	19	6	6	13	0	0
West South Central	14	7	7	11	10	14	7	7	3	11
Mountain	9	0	0	0	[8] 9	0	0	0	0	9
Pacific	5	0	2	2	5	7	0	2	0	5

PNEUMONIA DEATH RATES

	June 20, 1931	June 21, 1930	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930
91 cities	70	72	67	66	[2] 64	54	59	53	[3] 47	43
New England	65	75	60	53	36	36	79	44	50	39
Middle Atlantic	72	78	76	71	67	55	59	54	[4] 63	54
East North Central	60	52	51	56	[5] 61	40	47	37	[6] 29	32
West North Central	106	111	38	87	77	63	88	75	71	39
South Atlantic	89	70	103	72	[7] 67	60	71	60	39	54
East South Central	82	117	139	91	82	142	50	71	44	52
West South Central	76	64	90	85	90	78	86	78	45	46
Mountain	78	132	35	79	[8] 72	62	61	106	35	53
Pacific	34	60	41	45	46	52	31	50	24	15

[2] Milwaukee, Wis., Columba, S. C., and Billings, Mont., not included.
[3] Newark, N. J., and Racine, Wis., not included.
[4] Newark, N. J., not included.
[5] Milwaukee, Wis., not included.
[6] Racine, Wis., not included.
[7] Columbia, S. C., not included.
[8] Billings, Mont., not included.

FOREIGN AND INSULAR

ARGENTINA

San Juan Province—Plague.—Unofficial advices report an epidemic of plague in the Province of San Juan, Argentina.

CANADA

Provinces—Communicable diseases—Week ended July 11, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended July 11, 1931, as follows:

Province	Cerebrospinal fever	Dysentery	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia [1]					
New Brunswick [1]					
Quebec					12
Ontario	1		2	6	12
Manitoba [1]					
Saskatchewan				13	2
Alberta	1				2
British Columbia	1	1	1		
Total	3	1	3	19	28

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended July 18, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended July 18, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	27	Scarlet fever	21
Diphtheria	19	Smallpox	1
Erysipelas	1	Tuberculosis (pulmonary)	36
German measles	1	Tuberculosis (other forms)	3
Measles	56	Typhoid fever	15
Mumps	3	Whooping cough	6
Poliomyelitis	1		

CHINA

Chiobe and Changchow—Plague.—An outbreak of plague in Chiobe and Changchow, 25 and 65 miles, respectively, from Amoy, China, was reported July 23, 1931. It was said that 1,500 deaths had occurred during the preceding six weeks.

CZECHOSLOVAKIA

Communicable diseases—May, 1931.—During the month of May, 1931, certain communicable diseases were reported in the Republic of Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	10	1	Paratyphoid fever	14	1
Cerebrospinal meningitis	18	8	Puerperal fever	42	10
Diphtheria	1,029	60	Scarlet fever	1,016	27
Dysentery	9		Trachoma	209	
Malaria	70		Typhoid fever	234	22

SOUTH AMERICA

Yellow fever.—Quarantine officers of the Public Health Service are alert to the possible presence of yellow fever in parts of South America on the Caribbean coast, particularly the western part, and on the east coast south of the Amazon River to Rio de Janeiro. The port of Para (Belem) at the mouth of the Amazon River is regarded as infected and scattered cases have been reported at various interior points more or less close to several of the seaports along the coast. (See p. 1908.) It is understood that the Brazilian authorities are maintaining an effective antimosquito campaign in the principal seaports and that danger of maritime spread is decreased accordingly. Information has been received from reliable unofficial sources indicating the occurrence of cases of yellow fever in the interior of Colombia in the region of Santa Marta and Barranquilla, but as yet these reports lack official confirmation.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931				June, 1931				July, 1931		
						9	16	23	30	6	13	20	27	4	11	18
Ceylon: Colombo	C			1					1	1						
	D								1	1						
China:																
Canton	C				1			2				1				
	D							1								
Swatow	C										3	1	6			
Tientsin	C								1							
	D								1							
India	C	15,334	11,544	8,968	11,462	3,242	3,013	3,565	3,784							
	D	8,123	6,131	4,550	5,767	1,806	1,598	1,845	2,021							
Bombay	C	21			2										1	11
	D	9			1											6
Calcutta	C	121	170	436	310	72	89	49	55	94	74	50	74	72		
	D	86	112	256	176	39	44	34	32	57	47	26	38	35		
Karikal	C		9	12	19	10		1	1							
	D		8	12	14	5		1	1							
Madras	C	99	72	20	26	18	23	11		3	6				2	
	D	47	29	10	13	6	8	2	1		4					
Negapatam	D	3	3													
Rangoon	C								2		2		2			
	D	1							1		1		1			
Tuticorin	C	1	1													
Vizagapatam	C												1			
India (French):																
Chandernagor	C	1	5	7	6	3		1			1	2				
	D	1	5	6	5	3		1			1	2				
Pondicherry	C	19	100	100	24	3	8	2	4	1	1	1				
	D	11	34	18	4		3		4	1	1	1				
Indo-China (see also table below):																
Pnompenh	C	4	9		2					1					1	
	D	2	5	1	1	2				1					1	
Saigon and Cholon	C	6	4	5	27	25	23	34	22	18	16	14	13	8	3	
	D	3	4	5	22	20	18	25	13	9	14	9	9	3	2	

Persia: Rafsanjan [1]	C					31	1	4							
	D					12		2							
Philippine Islands: [2]															
Iloilo	C	2													
	D	2													
Provinces—															
Capiz	C	59	186	48	29	11	3		3	4					
	D	47	146	41	24	11	3		1	4					
Iloilo	C	145	95	7						8	7	5	6	24	3	
	D	110	65	4						6	5	6	4	22	3	
Masbate	C			21												
	D			9												
Negros, Occidental	C	90	4										2			
	D	56	4										1			
Negros, Oriental	C	1														
	D	1														
Pampanga	C					1										
Siam	C	3	1	10	16	11	2	1			1	3			1	
	D	1		2	4	3	1	1			1	1			1	
Ayudhaya District	C			1												
Bangkok	C	3	2	3	3	1	1	1					1	1		
	D	1	1	2	2			1					1			
Bismulok Province	C			8												
	D			2												
On vessel:																
S. S. Arankola, at Rangoon from Calcutta	C								1							
S. S. City of Eastborne, at Calcutta from Cocanada	C									1						
S. S. Tairea, at Penang from Calcutta	C										1					

Place		December, 1930	January, 1931	February, 1931	March, 1931			April, 1931			May, 1931			June, 1931	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):															
Cambodia [3]	C	28	62	125	14		65	36	22			44	40	83	96
Cochin China [3]	C	8	24	29	39	33	33	22	40		1	52	75	71	69

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25
Algeria:																	
Algiers	C	2	1	1													2
	D			1													
Bone	C	1								1							
Constantine, vicinity of	C	1	1														
	D	1															
Argentina:																	
Cordoba Province	C	1	2														
Entre Rios Province—Diamante	C		2														
Jujuy Province—Palpala	C	1	1														
San Juan Province	C														P	P	
Santa Fe	C		2														
Belgian Congo	C			2							1						
	D			2							1						
British East Africa (see also table below):																	
Tanganyika	C		22	8	18	17	5	7	17	4	7						
	D		4	1	21	11	2	8	9	2	4						
Uganda	C	25	15	19	35	11	33	31	63								
	D	24	15	19	32	11	26	23	61								
Ceylon: Colombo	C	8	11	8	4	1	1		1		1						
	D	6	13	7	3	1	1		1		1						
Plague-infected rats		2	3	4	1			5									
China: Amoy [1]	C					1											
	D					1											
Dutch East Indies:																	
Batavia and West Java	C	180	141	84	74	18	12	14	15	15							
	D	168	128	80	71	18	12	14	15	15							
East Java and Madura	C	4	1	4	1	1											
	D	4	1	4	1	1											
Java and Madura	D	427	376	277	243	47	41	46	42	41	53	48	45				
Egypt:																	
Alexandria	C	1	2	1								3	1	1	1	2	
	D											3	1	1			
Plague-infected rats		1	1														

Assiout	C	26	41	13	32	4	5	8	1	4		5	2				
	D	6	11	6	17	2	4	1					1				
Beni-Suef	C	1			12	3		2									
	D	1			3	1		2									
Cairo	C			1													
Delrout	C	21	16		3	7	1		2	3							
	D	4	4		1	2	2			1							
Gharbieh	C	1									1						
	D	1									1						
Girga	C	1		86	44	1	1	5						1			
	D	1		24	22	1	1										
Kena	C			5	3			1									
	D			2	1			1									
Manfalut	C	30	15	17													
	D	6	5	3													
Minieh	C	2		3	1	5		1		3				10		2	
	D	1		2		2		1		1				2		1	
Port Said	C										1	1	1	1	1	2	1
	D							1				1	1	1			
Hawaii Territory: Hamakua—Plague-infected rats								1									
India	C	5,335	5,457	9,139	6,142	434	139	130	49								
	D	3,422	3,661	7,037	5,199	385	143	131	33								
Bassein	C	4	1		1			1						1			
	D	3	1		1			1						1			
Bombay	C	1	1	4	11	5		1	1					1			
	D	1	1	3	11	4	1	1									
Plague-infected rats		34	32	70	137	26	30	17	21	10	10	10	7	11	16		
Calcutta	C				2												
	D				2												
Madras Presidency	C	312	74	23	3	1	1				1						
	D	182	46	21	2		1				1						
Rangoon	C	2		1	1	1			1		1					2	
	D	1		1	1	1			1		1					1	
Plague-infected rats		4	8	7	4	1	1	3	2		3			1	2		
Indo-China (see also table below): Pnompenh	C	7	1							1		1					
	D	7	4	6	4					1		1					
Iraq:																	
Baghdad	C	5	3	8	23	7	10	4	2	10	6	1	6	1	1		
	D	4	2	5	8	3	4	2		1	4	1	3	1			
Maudhan	C								2								
Madagascar (see also table below): Tamatave	C	9															
Morocco	C	13															
	D	4															
Nigeria: Lagos	C	1			5												
	D	1			5												
Plague-infected rats					6												
Peru (see table below).																	
Senegal (see table below).																	

[1] On July 23, 1931, an indirect report was received stating that an epidemic of plague had occurred in Chiobe and Changchow, China, not far from Amoy.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	May 16	May 23	May 30	June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11	July 18	July 25
Siam	C	4	18	31	1	1			1	1							
	D	2	14	7	1	1			1	1							
Bangkok	C	8	6	29													
	D	8	5	6													
Nagara Rajsima	C	9	7	1													
	D	10	6														
Syria: Beirut	C	1	1												1		
Tripolitania	C	8	1														
	D	3															
Tunisia: Tunis	C	1	14	10	16	7		8	1		8	2	1				
	D		7	4	8	3					1						
Union of Socialist Soviet Republics:																	
Gourandus	D	28															
Transcaucasia—Karabakh	C	6															
Union of South Africa:																	
Cape Province	C				3												
Orange Free State	C	P	1	6	2			1	1								
	D		1	1	2				2								

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
British East Africa (see also table above):							
Kenya	C	69	21	7	345	245	154
Indo-China (see also table above)	C			4	2		2
Madagascar (see also table above):							
Ambositra Province	C	100	92	70	30		
	D	96	88	66	29		
Antsirabe Province	C	66	84	83	48		
	D	57	79	74	47		
Miarinarivo Province	C	28	31	19	6		
	D	26	29	19	6		
Moramanga Province	C	7	7	1			
	D	5	7	1			
Tananarive Province	C	92	145	90	41		
	D	89	139	81	40		
Peru	C	29	12				
	D	8	6				
Senegal:							
Baol [1]	C					4	
	D					3	
Dakar [1]	C				2	63	64
	D				1	49	56
Louga [1]	C			14	1	5	
	D			6		2	
Rufisque [1]	C		2			1	2
Thies [1]	C						12
	D						3
Tivaouane [1]	C				4	19	3
	D					11	2

[1] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11
Algeria:																		
Algiers	C	1	1	2		2					1			7	1			
Bone	C	1																
Constantine	C			1					1								1	
Arabia: Aden	C	1	1															
Belgian Congo	C	50								7	10	30						
Belgium	C		1															
Bolivia.[1]																		
Brazil: Porto Alegre (alastrim)	C	3	7	49	20	19	8	6	2	4	7	6	2	3				
	D		1	1									1					
British East Africa: Tanganyika	C	70	91	8						13								
	D	5	13	3														
British South Africa: Southern Rhodesia	C	13												1				
Canada:																		
Alberta	C	7	1															
British Columbia	C	2	8															
Manitoba	C	1	1						4									
Winnipeg	C		1															
Nova Scotia	C	1		1														
Ontario	C	49	29	9	4		6	7	17	5		3		4	3	14	3	6
Kingston	C	1	1				2	3										
North Bay	C		1															
Ottawa	C	3	1												1			
Sault Ste. Marie	C	30	2		3	1				1								
Toronto	C			2		4			1						1			
Quebec	C	2															1	
Saskatchewan	C	38	63	58	5	16	3	22	7	15	18	8	7	16	18	13		13
Regina	C		1	2			2		2									
Canary Islands: Las Palmas	C			1														
Chile:																		
Antofagasta	C																1	
Chanaral	C											1						
China:																		
Amoy	C			1				2	2	1	1	2	1	2		1		
	D			1				1	1		1	1	1	1		1		
Canton	C		3	7	1	2	1				1	2			1		1	

[1] An epidemic of smallpox was reported on May 13 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11
China—Continued.																		
Foochow	C	P	P	P	P			P				P		P				
Hong Kong	C	1	9	2		1	2					1						
	D		3	2			1		1			1						
Manchuria—																		
Harbin	C	1	4	2					1	1		1						
Kwantung—Dairen	C			2			1	1	1			1	1					
Nanking	C	P	P	P	P	P	P	P	P	P	P							
Shanghai—																		
Foreigners only	C	12	16	6	2	1	2	2	1	4	1	1	2	6	2		2	1
Including natives	D	13	14	10	2	7	4	5	1		3	3	1	5	4	3	2	
Swatow	D	7	13	26	2													
Tientsin	C	1							2									
Chosen (see table below).																		
Colombia: Cali	D								1									
Dutch East Indies:																		
Batavia and West Java	C	29	2	1						1	1							
	D	2	1															
East Java and Madura	C											1						
Finland	C					1												
France (see table below).																		
Great Britain:																		
England and Wales	C	958	745	795	177	163	212	192	186	166	111	107	83	94	62	48	56	45
Bradford	C	4	1	2	1		1	4	1	3	1	3			5			
Leeds	C			1		1	1		1		1							
London	C	140	98	147	51	39	84	53	66	44	37	36	25	50	31	16	21	9
London and Great Towns	C	693	683	554	142	126	162	128	139	108	84	72	57	84	49	38	53	33
	D		1		1		1						1					
Sheffield	C	3	32	10	4	2	1											
Stoke-on-Trent	C	1	1															
Greece (see table below).																		
Honduras:																		
Amapala	C		1															
Ocotepeque and Gracias districts	C		P															
Puerto Castilla	C	11	3															
Tegucigalpa	C						1											
Tela	C				1													

India	C	9,623	12,222	11,791	3,980	3,749	3,468	3,068	3,422	2,836	2,477	2,668						
	D	2,245	2,660	2,261	807	684	680	752	709	572	538	530						
Bassein	C											1						
Bombay	C	7	6	10	2	2	1	3	3		6	1		2	1			
	D	1	3	4	1			4	1	1	1	1		1	1			
Calcutta	C	143	251	283	101	60	61	65	24	30	19	16	14	19	14		11	6
	D	100	188	203	78	42	50	54	18	25	17	15	12	18	11		9	4
Cochin	C	29	59	46	10	11	12	6	3									
	D		3															
Karachi	C	3	4	4		5		1							2			
	D	2		2											1			
Madras	C	16	8	22	12	4	1	2	1	3	3	1			1			2
	D		1	3	2	1	1	1		1	5							
Moulmein	C	2																
Negapatam	C				1	1		1							2	1		
Rangoon	C		4	3	2	2	1	6	7	5		1		1	4	1	2	
	D			1				1	2	1	1	1		1		1	1	
Vizagapatam	C	1	8	2	2	2	4	2			5	1	2	1		3	2	
	D		2	1	1		1				1			1		1	1	
India (French):																		
Chandernagor	C	9	12	14	3	1	4	2	3		4				1			
	D	1	1	2	3	1	2	1	3		2							
Karikal	C	5	19	3		1	1	2	1	1	1	1	1	2				1
	D	4	18			1		2	1	1	1	1	1	2				1
Pondicherry Province	C	45	19	14	3			3	1	2	7	1	3	2	1	1		
	D	45	19	14	3	3		3	1	2	7	1	3	2	1	1		
India (Portuguese)	C	5	14	8		19	2				3							
	D		3	3		4	2				1							
Indo-China (see also table below):																		
Pnompenh	C	1		1							1		2					
	D	1									1							
Saigon and Cholon	C	6	4	8	1					1		1					1	
	D	4	1	8	1					1							1	
Iraq:																		
Baghdad	C		9				1	1			1	2		1				
	D											2						
Basra	C											2		1				
Mosul Liwa	C	3	5															
	D		1															
Ivory Coast (see table below).																		
Japan:																		
Kobe	C		2															
Taiwan	C	1																
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D	1		1				1	1		1			1			1	1
Mexico City and surrounding territory	C		23	33	17	9	11	6	4	10	10	21	5	4	16			
	D	1	8	22	4	6	4		4	3	2	2	4	3	6			
Monterrey	C												1					
Torreon	C					1				1					1	2		
	D					2									1	1		
Vera Cruz	C		3	2		1		1	1									

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931 11	April 18	April 25	May, 1931 2	May 9	May 16	May 23	May 30	June, 1931 6	June 13	June 20	June 27	July, 1931 4	July 11
Morocco (see table below).																		
Nigeria: Lagos	C			2														
Panama Canal Zone	C	2																
Poland	C		1									3	1	1		1		
Portugal: Lisbon	C	103	40	52	8	18	11	19	19	14	16	18	5	17	12	14	15	
Siam	C	4	2				1				3	3						
	D											1						
Spain	C	P	P	P														
Straits Settlements	C	7	2	4	1		9											
	D	1	1	1	1	1	3											
Sudan (Anglo-Egyptian)	C	11	97	8				3		3		1						
	D	7	10	2								1						
Sudan (French) (see table below).																		
Syria (see table below).																		
Tunisia: Tunis	C	8		4														
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P		P	P								
Orange Free State	C	P	P	P	P	P	P		P	P	P	P	P	P				
Transvaal	C	P	P	P														
Upper Volta	C		18	3		3			1	2		85	11		1			
	D			1								1						
On vessel:																		
S. S. Clan Mactoggart at Suez	C		2															
S. S. Matheran at Suez from Calcutta	C	1																
S. S. Clan Buchanan at Suez	C		2															
S. S. Rotterdam at Naples from Venice	C			1														
S. S. Clan McTavish at Manila from Chittagong	C					1												
S. S. Benevue at Sydney from Shanghai	C	1																
S. S. Clan MacBrayne at Cochin	C		1															
S. S. Chilka at Rangoon	C		1															
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C							1										
S. S. Talodi at Suakin	C									1								

Place		December, 1930	January, 1931	February, 1931 1-10	February, 1931 11-20	February, 1931 21-28	March, 1931 1-10	March, 1931 11-20	March, 1931 21-31	April, 1931 1-10	April, 1931 11-20	April, 1931 21-30	May, 1931 1-10	May, 1931 11-20	May, 1931 21-31	June, 1931 1-10	June, 1931 11-20
Indo-China (see also table above)	C	61	141	95	46	27	125		139	100	42			17	41	30	16
Ivory Coast	C	9															
Sudan (French)	C	139					4		P								
	D	20															
Syria: Beirut	C		1														1

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen	C		1		11		1
	D		1		3		
France	C		4	16	15		
Greece	C	4		4			3
Mexico (see also table above)	D	1		3		1	1
Morocco	C	25		4	6	7	49
Rumania	C				1		1
Turkey	C	116	63	37	1		9
	D	9	7	6			

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931 11	April 18	April 25	May, 1931 2	May 9	May 16	May 23	May 30	June, 1931 6	June 13	June 20	June 27	July, 1931 4	July 11	July 18
Algeria:																			
Algiers	C		2	3			2	1	3		1	3	4	4		1			
Constantine Department	C	31	4	3	2		6	1	8	3	5	6	6	3	1	16	2		
Oran	C	3	1				1					2	2						
Australia, Western	C			1					1										
Bulgaria	C	13	5	9		26	4			5	8	3	11	10	6				
	D			2		3				1		3	2	1	1				
Chile: Valparaiso	D		1																

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	18	25	May, 1931: 2	9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18
China:																			
Canton	C	2		1															
Manchuria—Harbin	C	3	5	3			8												
Shanghai	C	2																	
Tientsin	C				1	1													
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C					1								1	1		1		
Beheira Province	C				3	1													
	D				2														
Cairo	C	1																	
Port Said	C	1																	
Eritrea: Asmara	C			1															
Great Britain: Scotland	C	1																	
Fife County	C											1							
Glasgow	C	2																	
	D	1																	
Greece (see table below).																			
Guatemala.[1]																			
Iraq: Baghdad	C		5	2					2										
	D		1						2										
Irish Free State:																			
Cork County—																			
Schull	C																	1	
Skibbereen	C													1		1	1		
Kerry County—																			
Dingle	C								1										
Listowel	C															1			
Limerick County—																			
Limerick	C																2		
Michelstown	C																1		
Mayo County—Belmullet	C					1													

Place																			
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico (see also table below).																			
Durango	D	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mexico City, including municipalities in Federal District	C	39	35	216	67	34	38	31	16	27	17	15	7	12	27	-	-	-	-
	D	34	16	84	18	7	17	14	9	7	7	10	4	4	11	-	-	-	-
San Luis Potosi	D	-	5	5	1	2	-	-	-	-	1	1	-	-	-	-	-	1	3
Morocco	C	8	28	7	-	1	-	12	-	13	29	-	-	31	42	28	37	20	-
	D	2	1	-			-	1	-	2	2	-	-	2	3	1	4	4	-
Palestine	C	2	3	5	1	2	-	2	2	1	1	-	-	2	3	-	2	-	-
Panama Canal Zone—Balboa	C	-	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-
Paraguay: Asuncion	D	4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poland	C	106	189	287	93	176	140	129	92	81	58	67	-	48	33	16	9	-	-
	D	8	19	15	8	7	6	7	6	4	5	3	-	2	1	-	2	-	-
Portugal: Oporto	C	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rumania	C	193	152	214	70	-	-	-	63	52	54	-	42	16	12	-	-	-	-
	D	16	24	16	8	-	-	-	10	5	3	-	4	7	2	-	-	-	-
Syria	C	-	-	-	-	-	-	-	-	1	3	-	-	-	-	-	-	-	-
Tunisia:																			
Sbeitla, vicinity of	C	-	-	20	2	-	-	10	-	-	-	-	-	-	-	-	-	-	-
	D	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sfax	C	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tunis	C	16	18	14	2	-	1	10	12	9	8	-	-	64	9	-	1	-	-
	D	-	-	-	-	-	-	-	1	2	-	-	-	4	-	-	-	-	-
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	1	P	P	P	-	P	P	P	P	P	P	-	-	-	-	-
Municipality of East London	C	3	-	P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Natal	C	P	P	1	P	P	P	P	P	-	P	P	P	P	-	-	-	-	-
Orange Free State	C	P	P	P	P	P	P	-	-	P	P	P	P	P	-	-	-	-	-
Transvaal	C	P	P	P	P	P	P	-	P	P	P	P	P	-	-	-	-	-	-
Yugoslavia (see table below).																			

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen: Seoul	C	1	1	-	3	4	-
Czechoslovakia	C	24	60	26	-	5	-
Greece	C	10	10	17	8	22	6
	D	-	2	2	1	3	-
Latvia	C	-	-	12	-	-	-

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Lithuania	C	6	26	3	99	34	10
	D	3	3	1	3	5	-
Mexico (see also table above)	D	85	66	83	-	-	-
Turkey	C	2	17	18	15	-	3
Yugoslavia	C	1	20	12	10	43	14
	D	1	2	-	1	5	-

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reported an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931				June, 1931				July, 1931		
						9	16	23	30	6	13	20	27	4	11	18
Brazil:																
Bahia State [1]	C			1												
Ceara State	C	1		2	2		1			1						
	D	1			2		1									
Minas Geraes State	C			2	5	1		1								
	D			1	2	1										
Rio de Janeiro State	C		1	2			1	1								
	D		1	2												
Cambucy	C	3	2	1												
	D	3	1													
Friburgo (imported)	C	1														
Padua	C	2	1													
	D	2														
Sergipe State	C										1					
British Cameroons: Mamfe	C						3			1		1				
	D						2		1							
Colombia.[2]																
Gold Coast:																
Akuse	C													2		
	D													1		
Kintampo	C															1
	D															1
Tamale	C														2	
	D														2	
Ivory Coast:																
Bobo Dioulasso	C														1	
Kong Circle	C															4
Sudan (French)	C															4

[1] The report of 2 cases of yellow fever in the State of Bahia, Brazil, during March, 1931, was erroneous. Only 1 case occurred, and the infection originated in a laboratory.
[2] 4 suspected cases of yellow fever were reported near Cienaga, Magdalena Province, Colombia, July 30, 1931.

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DIVISION OF SANITARY REPORTS AND STATISTICS

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PUBLIC HEALTH REPORTS

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AGE AND SEX INCIDENCE OF INFLUENZA AND PNEUMONIA MORBIDITY AND MORTALITY IN THE EPIDEMIC OF 1928–29 WITH COMPARATIVE DATA FOR THE EPIDEMIC OF 1918–19 [1]

BASED ON SURVEYS OF FAMILIES IN CERTAIN LOCALITIES IN THE UNITED STATES FOLLOWING THE EPIDEMICS

By SELWYN D. COLLINS, *Senior Statistician, United States Public Health Service*

CONTENTS

The unusual age incidence of influenza [2] during the epidemic of 1918–19, with its particularly high rates for young adults, has resulted in much attention being paid to age incidence during each of the several respiratory epidemics that have occurred since that time. The unusual age distribution of the 1918 influenza outbreak applies particularly to the cases that were complicated by pneumonia and to the deaths from influenza and pneumonia. It is of interest, however, to compare also the age incidence of cases designated as influenza or grippe and the milder types of illness that were reported as doubtfully influenza or merely as severe colds.

SOURCE AND CHARACTER OF DATA

Immediately following the fall peak of the 1918–19 epidemic, the United States Public Health Service made surveys in some 12 localities in various parts of the United States. When it was found that some of the localities had a second wave of influenza later in the winter of 1918–19, several of the places were resurveyed to com-

[1] From the Office of Statistical Investigations, U. S. Public Health Service.

[2] In the sickness data included in this paper the terms "influenza" and "pneumonia" designate the diagnoses as stated by the families, except that in fatal cases the cause of death as reported to the local registrar of vital statistics was substituted for the cause reported by the family wherever the data were available for comparing the reports. It is not intended to suggest that the two respiratory epidemics were necessarily etiologically the same.

plete the record for both waves. Immediately after the 1928–29 epidemic the United States Public Health Service made similar surveys in some 14 localities in various parts of the United States. Only three of the cities that were surveyed in 1918–19 were resurveyed in 1928–29.

The surveys in the two epidemics were made along generally comparable lines. The method was to make house-to-house canvasses, a record being made of the age, sex, color, etc., of each member of the household, and for each person who had had a respiratory attack during the brief period of the epidemic, a record of the date of onset, diagnosis and termination of the case was made. Ten to twenty districts were selected in each city that was to be surveyed, the districts being located in such a way that they would be representative of the city as a whole as regards geographical distribution and economic status of the persons surveyed, and in such other respects as the officer in charge of the survey could secure representative conditions. In the 1928–29 survey, 10 large cities were included. In each city of less than 400,000 inhabitants, a population of approximately 10,000 was canvassed, and in cities of over 400,000 a population of 15,000 was canvassed. Information for certain smaller towns and rural communities was added to the data, the canvasses in these latter places being made by State health authorities, but following the same plan as that used in the surveys made by the Public Health Service. In the 1928–29 survey, each of the 10 large cities is represented by approximately the same number of surveyed population. In the 1918–19 surveys there was more variation in the size of the samples, the surveyed population in the cities ranging from 4,000 to 33,000. The 1918–19 surveys covered a total of 146,203 persons in the 12 localities, of whom 84 per cent were white and the remainder colored. The 1928–29 surveys covered a total of 151,193 persons, of whom nearly 92 per cent were white and 8 per cent, except for 520 Japanese, were colored.

Although the two surveys were made along generally comparable lines, we can not be sure that the diagnoses recorded are comparable for the two periods. In certain respects known differences can be pointed out; but further than that it would seem impossible to say whether or not such terms as "influenza," "grippe," and "cold" designated in 1928–29 an attack of the same type as was so designated in 1918–19. The most comparable rate for the two epidemics would seem to be the total morbidity from respiratory causes exclusive of such minor colds as did not cause the patient to go to bed, since the 1918–19 data do not appear to include such minor attacks.

Because the epidemic of 1918–19 came largely in the early fall and that of 1928–29 came in midwinter, more pneumonia that occurs normally would be reported in the latter survey than in the 1918–19 survey.

Such cases as were designated by the housewife as "grippe" or "la grippe," in 1918–19 were put down as influenza. In 1928–29 the enumerators were instructed to inquire, when a case was reported as grippe, whether or not the informant meant by that diagnosis anything different from influenza, and if not, to record it as influenza, but otherwise to record the case as grippe. As will be seen later, the cases in 1928–29 recorded as grippe are identical with those recorded as influenza as regards both their chronological and their age distribution.

In the 1918–19 survey the enumerators were instructed to class as influenza such reported "colds" as lasted three days and kept the patient in bed one whole day, unless the case had been otherwise diagnosed by a physician. Other colds were to be recorded as "doubtful," but the number of such doubtful cases reported was so small that it appears that only the more severe colds were remembered by the informants. In 1918 attention must have been fixed on such cases as were reported as influenza, because of the unusual importance of the disease during the great pandemic. In the 1928–29 survey the enumerators were instructed to inquire about and to record "colds" as such, in addition to influenza, grippe, and pneumonia. While the record of "colds" must be incomplete, because minor cases were forgotten, it seems reasonable to believe that it contains a larger proportion of the colds that actually occurred than was true of the "doubtful" category of the 1918–19 surveys. The colds reported in the 1928–29 survey have been classified into those confining the patient to bed for one or more days and those in which the patient was not confined to bed. For purposes of comparison with the 1918 surveys, the colds confining the patient to bed have been included with influenza, pneumonia, and grippe as more nearly approximating the influenza, pneumonia, and "doubtful" category of the 1918–19 data. The cases designated as colds in 1928–29 and those designated as "doubtful" in 1918–19 seem to be similar to influenza as regards their chronological distribution, but are somewhat different as regards their age incidence.

Table 1.—*Age and sex incidence of certain respiratory diseases during a period of approximately three months*[1] *in canvassed familes in 14 localities*[2] *in the United States*

EPIDEMIC OF 1928-29—ALL SURVEYED LOCALITIES

Age (years)	Total case rate per 1,000 persons canvassed (including influenza, grippe, pneumonia, and colds in bed)			Death rate from influenza and pneumonia per 1,000 persons canvassed			Per cent of the total cases that were fatal (case fatality)			Pneumonia[3] case rate per 1,000 persons canvassed			Per cent of the total cases that were complicated by pneumonia[3]			Per cent of pneumonia[3] cases that were fatal (pneumonia fatality)		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	189	172	205	1.05	1.03	1.08	0.56	0.60	0.53	5.0	4.9	5.1	2.6	2.8	2.5	21.0	21.0	21.1
Under 1	138	150	126	4.84	5.85	3.72	3.50	3.91	2.96	19.4	24.2	14.0	14.0	16.2	11.1	25.0	24.1	26.7
1 to 4	249	258	241	1.36	1.17	1.55	.55	.45	.65	13.8	13.8	13.8	5.5	5.4	5.7	9.9	8.5	11.3
Under 5	229	237	221	1.99	2.05	1.93	.87	.86	.87	14.8	15.8	13.8	6.5	6.7	6.3	13.4	13.0	14.0
5 to 9	248	245	252	------			------			5.1	4.8	5.3	2.0	2.0	2.1			
10 to 14	200	186	213	.23	.36	.15	.11	.18	.07	2.0	2.3	1.7	1.0	1.2	.8	7.8	10.0	5.1
15 to 19	163	151	175	.55			.34			2.6	3.6	1.6	1.6	2.4	.9			
20 to 24	157	129	181	.08			.05			1.7	1.1	2.2	1.1	.8	1.2			
25 to 29	183	150	210	.25	.18	.45	.14	.12	.22	3.0	2.2	3.6	1.6	1.5	1.7	12.5	10.0	13.6
30 to 34	199	168	225	.66			.33			3.3	2.1	4.3	1.7	1.3	1.9			
35 to 39	198	180	215	.89			.45			3.6	4.3	3.0	1.8	2.4	1.4			
40 to 44	186	164	203	.54	.82	.72	.29	.49	.35	4.1	3.6	4.5	2.2	2.2	2.2	20.3	21.7	19.0
45 to 49	172	150	192	.88			.51			3.6	3.2	4.0	2.1	2.1	2.1			
50 to 54	169	148	189	1.28	1.76	.83	.77	1.19	.45	5.6	5.4	5.7	3.3	3.7	3.1	23.1	32.4	14.6
55 to 59	164	149	178															
60 to 64	169	145	190	3.27	3.17	3.36	1.91	2.20	1.73	7.3	7.4	7.2	4.2	5.1	3.7	45.0	42.9	46.9
65 to 69	175	144	200															
70 to 74	181	146	209	9.26	7.20	10.81	5.13	4.81	5.31	16.8	13.9	18.9	9.3	9.3	9.3	55.3	51.9	57.1
75 and over	179	154	198															

[1] The period covered varied from 9 to 14 weeks in the different localities. The dates of beginning of the periods also varied, the weeks included being those during which respiratory illnesses appeared to have occurred with undue frequency in the particular locality.
[2] See footnote to Table 3 for a list of the localities.
[3] Fatal cases of influenza or grippe that were not designated as pneumonia in the family statement were included as pneumonia cases in all computations.

TABLE 2.—*Age and sex incidence of specific respiratory diagnoses as reported by the canvassed families as occurring during a period of approximately three months* [1] *in 14 localities* [2] *in the United States*

EPIDEMIC OF 1928–29—ALL SURVEYED LOCALITIES

Age (years)	Case rate per 1,000 persons canvassed											
	Influenza			Grippe			Colds with 1 or more days in bed			Colds with no days in bed		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	99.3	89.9	107.8	45.3	40.2	49.9	39.6	37.3	41.8	76.6	74.7	78.3
Under 1	51.5	56.8	45.6	27.7	28.4	27.0	39.6	40.1	39.1	69.0	66.8	71.6
1 to 4	120.7	124.8	116.6	57.8	58.2	57.4	56.8	60.9	52.8	94.5	94.2	94.7
Under 5	108.2	111.9	104.4	52.4	52.6	52.2	53.7	57.0	50.4	89.9	89.0	90.7
5 to 9	119.6	116.4	122.7	59.6	59.7	59.6	64.1	64.3	63.8	84.7	81.5	87.9
10 to 14	88.2	77.7	98.2	49.9	47.0	52.6	59.7	58.8	60.6	73.4	72.5	74.3
15 to 19	79.0	72.7	84.8	37.8	36.2	39.3	43.8	38.0	49.1	71.0	65.7	75.8
20 to 24	88.3	74.7	99.5	35.7	27.7	42.3	31.8	25.3	37.2	71.3	68.4	73.6
25 to 29	101.6	83.9	116.4	43.6	33.5	52.1	34.3	30.3	37.6	72.2	72.8	71.8
30 to 34	116.4	100.7	130.1	47.7	36.2	57.7	31.1	29.4	32.6	72.9	73.8	72.2
35 to 39	116.0	106.0	125.4	48.6	42.8	54.1	30.0	27.1	32.7	70.5	69.1	71.8
40 to 44	108.3	96.3	120.3	43.8	35.7	52.0	30.1	28.7	31.5	70.5	69.0	71.9
45 to 49	96.1	83.3	107.8	41.3	37.1	45.1	31.2	26.8	35.2	77.3	75.2	79.2
50 to 59	88.2	78.9	96.9	40.9	35.2	46.4	32.1	28.9	35.1	82.2	77.6	86.5
60 to 69	88.2	75.3	99.1	43.9	35.7	50.9	31.9	25.9	37.0	82.7	83.2	82.3
70 and over	93.7	79.2	104.6	45.2	39.1	49.0	24.7	17.5	30.1	81.2	79.1	80.0

[1] The period covered varied from 9 to 14 weeks in the different localities. The dates of beginning of the periods also varied, the weeks included being those during which respiratory illnesses appeared to have occurred with undue frequency in the particular locality.
[2] See footnote to Table 3 for a list of the localities.

TABLE 8.—*Number of persons canvassed and the number of cases of certain respiratory diseases reported by the families as occurring during a period of approximately three months [1] in 14 localities [2] in the United States*

EPIDEMIC OF 1928–29—ALL SURVEYED LOCALITIES

Age (years)	Both sexes [3]							Male							Female						
	Persons canvassed	Total cases, including influenza, grippe, pneumonia, and colds in bed	Pneumonia cases [4]	Influenza cases	Grippe cases	Cases of colds in bed	Influenza and pneumonia deaths	Persons canvassed	Total cases, including influenza, grippe, pneumonia, and colds in bed	Pneumonia cases [4]	Influenza cases	Grippe cases	Cases of colds in bed	Influenza and pneumonia deaths	Persons canvassed	Total cases, including influenza, grippe, pneumonia, and colds in bed	Pneumonia cases [4]	Influenza cases	Grippe cases	Cases of colds in bed	Influenza and pneumonia deaths
All ages	151,193	28,603	756	15,006	6,848	5,993	159	72,147	12,429	353	6,485	2,902	2,689	74	79,040	16,174	403	8,521	3,946	3,304	85
Under 1	2,274	314	44	117	63	90	11	1,197	179	29	68	34	48	7	1,075	135	15	49	29	42	4
1 to 4	10,291	2,564	142	1,242	595	585	14	5,137	1,324	71	641	299	313	6	5,154	1,240	71	601	296	272	8
Under 5	12,565	2,878	186	1,359	658	675	25	6,334	1,503	100	709	333	361	13	6,229	1,375	86	650	325	314	12
5 to 9	13,798	3,427	70	1,650	823	884		6,871	1,685	33	800	410	442		6,927	1,742	37	850	413	442	
10 to 14	13,197	2,634	26	1,162	658	788	3	6,549	1,217	15	509	308	385	2	6,648	1,417	11	653	350	403	1
15 to 19	12,780	2,086	33	1,010	483	560	7	6,055	911	22	440	219	230	5	6,725	1,175	11	570	264	330	2
20 to 24	12,700	2,000	21	1,121	454	404	1	5,733	738	6	428	159	145		6,967	1,262	15	693	295	259	1
25 to 29	11,808	2,155	35	1,200	515	405	3	5,374	806	12	451	180	163	1	6,434	1,349	23	749	335	242	2
30 to 34	12,064	2,394	40	1,404	575	375	8	5,612	945	12	565	203	165	2	6,451	1,449	28	839	372	210	6
35 to 39	12,427	2,464	45	1,442	604	373	11	6,008	1,083	26	637	257	163	8	6,419	1,381	19	805	347	210	3
40 to 44	11,108	2,069	45	1,203	487	334	6	5,548	911	20	534	198	159	2	5,560	1,158	25	669	289	175	4
45 to 49	9,085	1,564	33	873	375	283	8	4,336	652	14	361	161	116	3	4,748	912	19	512	214	167	5
50 to 54	8,493	1,433	47	755	341	290	10	4,172	618	22	329	145	122	6	4,321	815	25	426	196	168	4
55 to 59	5,527	905	31	481	233	160	8	2,647	394	15	209	95	75	6	2,880	511	16	272	138	85	2
60 to 64	4,969	839	30	430	213	166	13	2,318	335	17	178	80	60	4	2,651	504	13	252	133	106	9
65 to 69	3,277	573	30	297	149	97	14	1,467	211	11	107	55	38	8	1,810	362	19	190	94	59	6
70 to 74	2,332	423	24	220	114	65	7	1,016	148	10	77	40	21	3	1,316	275	14	143	74	44	4
75 and over	2,206	395	52	205	91	47	35	929	143	17	77	36	13	11	1,275	252	35	128	55	34	24
Unknown	2,857	364	8	194	75	87		1,178	129	1	74	23	31		1,679	235	7	120	52	56	

[1] The period covered varied from 9 to 14 weeks in the different localities. The dates of beginning of the periods also varied, the weeks included being those during which respiratory illnesses appeared to have occurred with undue frequency in the particular locality.

[2] Boston, Mass., four minor Massachusetts towns, Syracuse, N. Y., Cattaraugus County, N. Y., four minor New York towns, Baltimore, Md., Pittsburgh, Pa., Cincinnati, Ohio, New Orleans, La., Kansas City, Mo., Farmington, Mo., Des Moines, Iowa, Seattle, Wash., and San Francisco, Calif.

[3] "Both sexes" includes a few of unknown sex.

[4] Pneumonia cases include a few fatal cases of influenza and gripppe that were not designated as pneumonia in the family statement.

TABLE 4.—*Age and sex incidence of certain respiratory diseases during a period of approximately four months*[1] *in canvassed families in about 12 localities*[2] *in the United States*

EPIDEMIC OF 1918–19—ALL SURVEYED LOCALITIES

Age (years)	12 surveyed localities[2]												11 surveyed localities[2]											
	Total case rate per 1,000 persons canvassed (including influenza, grippe, pneumonia, and doubtful)			Death rate from influenza and pneumonia per 1,000 persons canvassed			Per cent of the total cases that were fatal (case fatality)			"Doubtful" case rate per 1,000 persons canvassed			Influenza and grippe case rate per 1,000 persons canvassed			Pneumonia[3] case rate per 1,000 persons canvassed			Per cent of the total cases that were complicated by pneumonia[3]			Per cent of pneumonia[3] cases that were fatal (pneumonia fatality)		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	294	288	299	5.0	5.3	4.7	1.7	1.8	1.6	22.0	20.8	23.1	239.3	231.5	245.9	17.6	18.4	17.0	6.3	6.8	5.9	25.5	26.5	24.5
Under 1	207	214	199	15.2	17.1	13.3	7.4	8.0	6.7	18.7	14 9	22.4	157.4	165.0	148.0	24.9	28.8	21.3	12.2	13.6	11.0	43.3	44.1	42.3
1 to 4	337	348	325	6.2	5.4	7.1	1.8	1.5	2.2	24.7	25.1	24.4	270.4	281.4	259.5	26.0	27.5	24.5	8.1	8.2	7.9	18.6	12.9	25.0
Under 5	312	322	301	7.9	7.6	8.3	2.5	2.4	2.8	23.6	23.1	24.0	248.7	259.4	237.8	25.8	27.7	23.8	8.6	8.9	8.3	23.1	19.0	28.0
5 to 9	391	388	394	2.2	1.9	2.4	.6	.5	.6	24.9	24.7	25.1	339.6	340.2	339.1	14.8	14.1	15.5	3.9	3.7	4.1	11.8	11.4	12.2
10 to 14	381	379	383	2.1	1.4	2.8	.6	.4	.7	26.1	26.6	25.6	321.6	320.9	322.2	11.5	12.1	11.0	3.2	3.4	3.0	16.1	11.4	20.9
15 to 19	345	332	356	3.4	4.0	2.9	1.0	1.2	.8	21.9	17.9	25.3	281.2	262.8	295.9	15.5	17.2	14.2	4.9	5.8	4.2	19.1	22.1	16.1
20 to 24	323	288	343	6.2	6.8	5.8	1.9	2.4	1.7	21.6	16.8	24.2	259.3	214.7	282.2	23.1	24.1	22.5	7.6	9.4	6.8	25.0	27.5	23.6
25 to 29	337	328	344	9.9	13.3	7.6	2.9	4.1	2.2	18.4	14.1	21.3	277.5	259.0	289.6	31.1	37.4	26.9	9.5	12.1	7.9	30.1	36.3	24.5
30 to 34	326	320	331	7.9	9.1	6.8	2.4	2.8	2.1	13.7	23.2	24.2	266.8	255.2	276.6	25.7	29.0	22.9	8.1	9.4	7.0	28.0	29.9	25.9
35 to 39	296	295	296	6.3	7.9	4.7	2.1	2.7	1.6	19.9	17.7	22.1	244.2	241.7	246.8	21.0	24.1	17.9	7.4	8.5	6.2	28.6	31.1	25.3
40 to 44	236	242	230	4.0	4.1	3.9	1.7	1.7	1.7	20.9	22.9	19.1	191.7	194.5	189.1	13.0	13.2	12.8	5.8	5.7	5.8	28.6	29.1	28.1
45 to 49	207	200	215	2.9	3.5	2.3	1.4	1.8	1.1	21.8	20.7	23.0	167.4	159.7	175.6	9.8	11.0	8.6	4.9	5.7	4.1	27.4	28.6	25.8
50 to 54	175	167	184	2.6	2.8	2.4	1.5	1.7	1.3	20.6	20.0	21.1	132.1	124.9	138.8	8.3	6.2	10.3	5.1	4.1	6.0	28.0	40.0	21.2
55 to 59	162	157	166																					
60 to 64	143	128	157	4.3	3.3	5.6	3.1	2.3	3.8	21.7	20.5	22.9	101.7	94.4	108.5	9.3	6.1	12.2	7.0	5.0	8.5	45.1	43.8	45.7
65 to 69	135	132	138																					
70 to 74	111	114	108	5.1	4.2	5.8	5.1	4.2	5.7	12.5	11.1	13.6	74.6	76.4	73.4	6.5	4.2	8.2	6.9	4.5	8.5	57.9	60.0	57.1
75 and over	88	83	92																					

[1] The period covered began Sept. 1, 1918, and continued for 3 to 5 months in the different localities.
[2] See footnote to Table 5 for a list of the 12 localities. In the survey of Charles County, Md., pneumonia was not consistently distinguished from influenza, and in all rates involving pneumonia cases the data are used for the 11 localities exclusive of Charles County.
[3] Fatal cases of influenza or grippe that were not designated as pneumonia in the family statement were included as pneumonia cases in all computations.

Table 5.—*Number of persons canvassed and the number of cases of certain respiratory diseases reported by the families as occurring during a period of approximately four months [1] in various localities [2] in the United States*

EPIDEMIC OF 1918–19 IN 12 SURVEYED LOCALITIES

Age (years)	Both sexes [3]				Males				Females			
	Persons canvassed	Total cases including influenza, grippe, pneumonia, and doubtful	"Doubtful" cases	Influenza and pneumonia deaths	Persons canvassed	Total cases including influenza, grippe, pneumonia, and doubtful	"Doubtful" cases	Influenza and pneumonia deaths	Persons canvassed	Total cases including influenza, grippe, pneumonia, and doubtful	"Doubtful" cases	Influenza and pneumonia deaths
All ages	146,203	42,920	3,216	730	68,684	19,742	1,429	363	77,495	23,169	1,787	367
Under 1	2,838	586	53	43	1,407	301	21	24	1,427	281	32	19
1 to 4	11,933	4,016	295	74	5,984	2,081	150	32	5,945	1,933	145	42
Under 5	14,771	4,602	348	117	7,391	2,382	171	56	7,372	2,217	177	61
5 to 9	14,725	5,755	366	32	7,342	2,845	181	14	7,382	2,910	185	18
10 to 14	14,182	5,404	370	30	6,994	2,649	186	10	7,187	2,755	184	20
15 to 19	12,897	4,448	282	44	5,986	1,985	107	24	6,909	2,461	175	20
20 to 24	12,287	3,967	265	76	4,405	1,267	74	30	7,881	2,699	191	46
25 to 29	12,234	4,127	225	121	4,953	1,624	70	66	7,281	2,503	155	55
30 to 34	11,668	3,805	277	92	5,385	1,723	125	49	6,283	2,082	152	43
35 to 39	11,074	3,276	220	70	5,546	1,638	98	44	5,527	1,638	122	26
40 to 44	9,415	2,219	197	38	4,592	1,112	105	19	4,823	1,107	92	19
45 to 49	8,157	1,688	178	24	4,250	850	88	15	3,907	838	90	9
50 to 54	6,628	1,162	132	20	3,319	555	64	11	3,308	607	68	9
55 to 59	4,323	698	93	8	2,130	334	45	4	2,192	363	48	4
60 to 64	3,756	537	80	14	1,848	237	39	4	1,908	300	41	10
65 to 69	2,456	332	55	13	1,170	154	23	5	1,286	178	32	8
70 to 74	1,703	189	21	9	744	85	7	1	959	104	14	8
75 and over	1,650	145	21	8	702	58	9	5	948	87	12	3
Unknown	4,277	566	86	14	1,927	244	37	6	2,342	320	49	8

[1] The period covered began Sept. 1, 1918, and continued for 3 to 5 months in the different localities.
[2] New London, Conn., Baltimore, Md., five minor Maryland towns, Charles County, Md., Spartanburg, S. C., Augusta, Ga., Macon, Ga., Louisville, Ky., Des Moines, Iowa, Little Rock, Ark., San Antonio, Tex., and San Francisco, Calif.
[3] Both sexes includes a few of unknown sex.

TABLE 6.—*Number of persons canvassed and the number of cases of certain respiratory diseases reported by the families as occurring during a period of approximately four months [1] in various localities [2] in the United States*

EPIDEMIC OF 1918–1919 IN 11 SURVEYED LOCALITIES

Age (years)	Both sexes [3]					Males					Females				
	Persons canvassed	Total cases, including influenza, grippe, pneumonia, and doubtful	"Doubtful" cases	Pneumonia cases [4]	Influenza and pneumonia deaths	Persons canvassed	Total cases, including influenza, grippe, pneumonia, and doubtful	"Doubtful" cases	Pneumonia cases [4]	Influenza and pneumonia deaths	Persons canvassed	Total cases, including influenza, grippe, pneumonia, and doubtful	"Doubtful" cases	Pneumonia cases [4]	Influenza and pneumonia deaths
All ages	130,056	36,374	2,966	2,290	583	60,109	16,305	1,286	1,104	293	69,924	20,060	1,680	1,186	290
Under 1	2,408	490	51	60	26	1,182	250	21	34	15	1,223	237	30	26	11
1 to 4	10,164	3,276	264	264	49	5,093	1,705	132	140	18	5,067	1,571	133	124	31
Under 5	12,572	3,766	315	324	75	6,275	1,955	153	174	33	6,290	1,808	162	150	42
5 to 9	12,550	4,781	333	186	22	6,232	2,370	162	88	10	6,317	2,411	171	98	12
10 to 14	11,879	4,285	328	137	22	5,777	2,085	161	70	8	6,101	2,200	167	67	14
15 to 19	11,153	3,562	253	173	33	5,011	1,494	91	86	19	6,140	2,066	162	87	14
20 to 24	11,098	3,381	247	256	64	3,773	969	68	91	25	7,324	2,411	179	165	39
25 to 29	11,335	3,709	212	352	106	4,494	1,394	62	168	61	6,841	2,315	150	184	45
30 to 34	10,857	3,447	271	279	78	4,961	1,531	121	144	43	5,896	1,916	150	135	35
35 to 39	10,138	2,895	206	213	61	5,061	1,436	91	122	38	5,076	1,459	115	91	23
40 to 44	8,635	1,946	179	112	32	4,165	958	93	55	16	4,468	988	86	57	16
45 to 49	7,414	1,482	168	73	20	3,820	733	81	42	12	3,594	749	87	31	8
50 to 54	6,048	1,014	125	44	17	2,991	471	60	17	9	3,056	543	65	27	8
55 to 59	3,825	584	87	38	6	1,851	264	40	13	3	1,973	319	47	25	3
60 to 64	3,353	452	69	30	12	1,642	198	33	10	3	1,711	254	36	20	9
65 to 69	2,152	277	49	21	11	997	120	20	6	4	1,155	157	29	15	7
70 to 74	1,485	157	20	14	8	619	66	6	3	1	866	91	14	11	7
75 and over	1,423	118	19	5	3	585	45	8	2	2	838	73	11	3	1
Unknown	4,139	518	85	33	13	1,855	216	36	13	6	2,278	300	49	20	7

[1] The period covered began Sept. 1, 1918, and continued for 3 to 5 months in the different localities.
[2] Same localities as enumerated in footnote to Table 5 except that Charles County, Md., is omitted. In that locality pneumonia was not consistently distinguished from influenza, and in all rates involving pneumonia cases the data are used for all localities except Charles County.
[3] Both sexes includes a few of unknown sex.
[4] Pneumonia cases include a few fatal cases of influenza or grippe that were not designated as pneumonia in the family statement.

The survey of 1918–19 includes respiratory illness during an average period of something like four months, as compared with an average period of about three months for the 1928–29 epidemic. Although this fact would at first seem to make the results incomparable without an adjustment to an equal time interval, it will be remembered that during the winter of 1918–19 the influenza-pneumonia death rate was definitely above normal for a period of about seven months, as compared with a period of about three months during the winter of 1928–29 (1). Since it is impossible to compute excess sickness rates, because no comparable data are available for "normal" years, the morbidity data represent all respiratory illnesses of certain types that were reported by the families as occurring during the period when those diseases were unusually prevalent. The period of four or five months for the 1918–19 epidemic appears to include less time than the total epidemic, even though it is a longer period than was covered in the 1928–29 surveys.

The cities surveyed in 1918–19 were not identical with those surveyed in 1928–29. Three cities were surveyed after both epidemics, but a comparison of the incidence of respiratory conditions in the two epidemics did not seem as worth while for these three cities as for the group of cities as a whole. In a later publication the results for individual cities will be considered. Tables 1 to 6 give rates and cases for both epidemics. In later sections the data will be presented in graphic form.

TOTAL MORBIDITY FROM INFLUENZA, GRIPPE, PNEUMONIA, AND SEVERE COLDS

The most comparable figure as regards the 1918–19 and 1928–29 epidemics is probably the case rate from all respiratory conditions except the minor colds that did not cause the patient to go to bed. Considering all localities, the rate for influenza, grippe, pneumonia, and colds in bed was 189 per 1,000 in the 1928–29 epidemic, as compared with a rate for influenza, grippe, pneumonia, and "doubtful" of 294 per 1,000 in the 1918–19 epidemic.

For cases definitely classified as influenza or grippe, the 1928–29 rate of 145 per 1,000 persons is somewhat more than half the rate of 239 in the 1918–19 epidemic. In the 1918–19 epidemic the incidence of pneumonia was 17.6 per 1,000, or more than three times the rate of 5.0 in 1928–29. The incidence of cases classified as "doubtful," 21.5 per 1,000, in the 1918–19 surveys was only about half the rate of 39.6 for colds with one or more days in bed in the 1928–29 epidemic. In addition, there was reported in 1928–29 a large number of colds (76.6 per 1,000) that involved no days in bed.

The morbidity rate (influenza, grippe, pneumonia, and severe colds) varied considerably in the different localities in both epidemics. In 1928–29 the rates ranged from 138 in Baltimore to 348 per 1,000

in Cattaraugus County, N. Y., the next lower figure being 304 per 1,000 in Des Moines, Iowa. For the 1918–19 epidemic the rates varied from 150 in Louisville to 535 per 1,000 in San Antonio. Lonaconing, Md., which is included in the locality group designated as "minor Maryland towns," had a rate of 612 per 1,000.

Figure 1 shows the age incidence of the total group of respiratory causes in the two epidemics. The very high incidence under 30 years

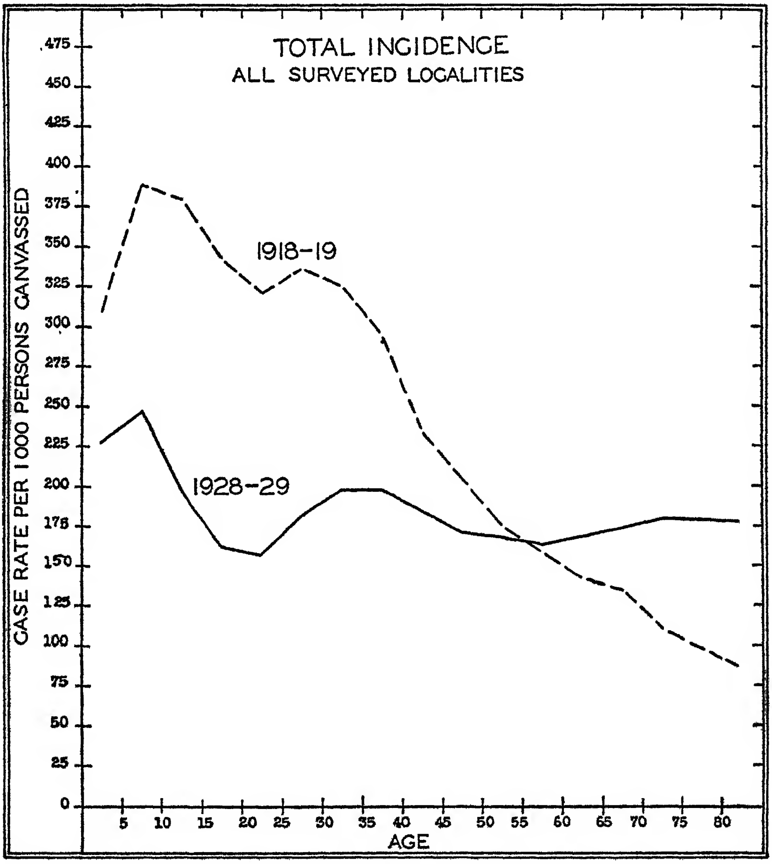

FIGURE 1.—Age incidence of respiratory illnesses in surveyed groups during the epidemics of 1928–29 and 1918–19. (Cases include influenza, grippe, pneumonia, and colds with one or more days in bed)

of age and the rather rapid decline as age increases, conditions which were characteristic of the 1918–19 epidemic, are not found in the 1928–29 epidemic. There are, however, certain similarities—a rather high incidence under 10 years of age followed by a considerable drop to a minimum from 15 to 24, with a rise and a second peak between 25 and 40 years of age. This type of curve seems to run rather consistently through the various localities in 1928–29. That,

in general, is the description of the age curve of influenza that has occurred in the several minor epidemics between 1918 and 1929.

The data on influenza have been tabulated by sex as well as by age. It should be remembered when considering case rates of women as compared with those of men that in surveys of this kind the housewife or other adult woman of the household is usually the one who gives the information to the enumerator. While she would no doubt remember the serious illnesses of the other members of the household, it is quite probable that her own minor colds or even attacks that might have been designated as grippe or influenza would be more

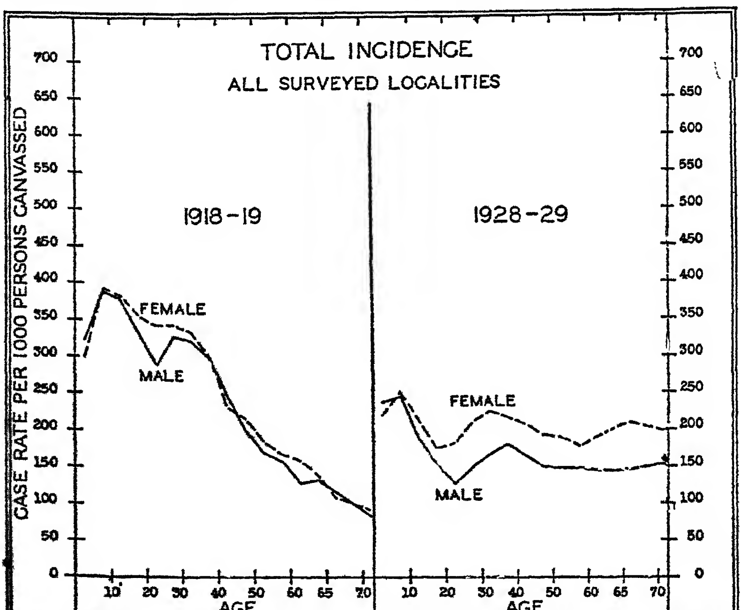

FIGURE 2.—Sex incidence of respiratory illnesses in surveyed groups during the epidemics of 1928-29 and 1918-19. (Cases include influenza, grippe, pneumonia, and colds with one or more days in bed)

likely to be recalled than attacks of other adult members of the household. In the Hagerstown study (2) it was found that adult women reporting upon themselves had a considerably higher illness rate than other adult women upon whom they were reporting.

Figure 2 shows the morbidity case rate (influenza, grippe, pneumonia, and severe colds) among males and females of different ages. The 1918-19 epidemic shows little difference between the sexes with respect to the total incidence. From about 10 to 35 years of age the rate for females is slightly greater than the rate for males, but at other ages there are only small differences that are probably not significant. In the 1928-29 epidemic the rate for women is consistently higher

than the rate for men. The fact that the differences are small for the ages below 20 years suggests that at least part of the excess of the rate for women over that for men is due to the fact that the women were the informants.

PNEUMONIA INCIDENCE

In 1928–29 the pneumonia rate was 5.0 cases per 1,000 population, or less than one-third of the rate, 17.6, for the 1918–19 epidemic. Because the 1918–19 epidemic had its peak so much earlier in the fall when the normal pneumonia rate would be low, the difference in the excess rate would probably be considerably greater.

In the 1928–29 epidemic the pneumonia case rates per 1,000 ranged from 2.3 in San Francisco to 10.4 in Cattaraugus County, Pittsburgh being the highest city with a rate of 8.1. The range in the 1918–19 pneumonia case rates is from 6.7 in Spartanburg to 25.8 per 1,000 in the group of minor Maryland towns, the rate in one of these towns, Cumberland, being 33.1. The highest city rate, that for San Antonio, was 24.2, or just below the rate for the group of minor Maryland towns.

The young adult peak so frequently referred to in connection with the 1918–19 epidemic is more prominent in the severe cases such as pneumonia and in the fatal cases than it is in the less severe types. The most striking fact brought out in Figure 3, which shows the age incidence of pneumonia in 1918–19 and 1928–29, is this very prominent young adult peak in 1918–19. The incidence of pneumonia in these surveyed localities was higher among persons 25 to 29 years of age than in any other age group. This is in contrast to the curve of pneumonia during the 1928–29 epidemic, when the highest rates were for young children and persons of the oldest age group. This latter curve is of the same character as the death rate from pneumonia in normal years. The 1918–19 curve has, like the usual pneumonia curve, a high rate for children under 5 years of age, in addition to its abnormal young adult peak at 25 to 29 years of age. The high rate among older people, however, appears to be missing, the rate during the 1928–29 epidemic for persons over 70 years of age actually being higher than the corresponding rate as reported during the 1918–19 epidemic.

Figure 4 shows pneumonia case rates for males and females of the different ages during the two epidemics. The incidence of pneumonia in 1928–29 is very similar for males and females. In neither sex is there any tendency toward a young adult peak in the curve. In the epidemic of 1918–19 the rate for males is higher than that for females from 10 to 50 years of age. Young adult females show the same peak as young adult males, the highest rate coming in the age group 25 to 29 in each sex. Among females over 50 years of age, the rate

seems to be higher than among males, but the difference may not be significant, inasmuch as the number of cases is not large in these ages.

MORTALITY FROM INFLUENZA AND PNEUMONIA

The mortality from influenza and pneumonia in the surveyed population during the 1928–29 epidemic was 1.05 per 1,000 persons canvassed as compared with 4.99 during the 1918–19 epidemic. As

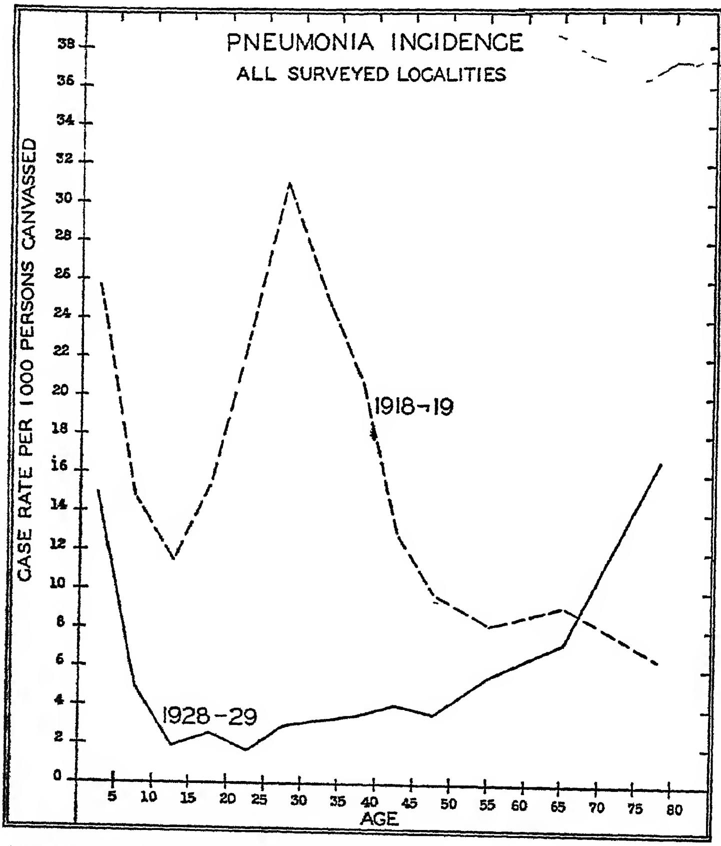

FIGURE 3.—Age incidence of pneumonia morbidity in surveyed groups during the epidemics of 1928–29 and 1918–19

noted in connection with pneumonia incidence, the difference between the *excess* mortality during the two epidemics would be considerably greater than this, because the 1918–19 epidemic had its peak earlier in the fall when the normal death rate from influenza and pneumonia is appreciably less than in midwinter when the 1928–29 outbreak occurred.

There are several possibilities of error in mortality rates based on the canvassed population. (*a*) Although the surveyed groups include a comparatively large number of individuals, the number of deaths that would be expected and that do occur is so small that it may be the source of considerable error in the rates. (*b*) As in the case of the incidence, but with probably greater chances of error, these canvassed groups may not be representative of the country as a whole and may not even be representative of the cities in which they are located. (*c*) Although the enumerators were instructed to inquire specifically about deaths that occurred in the family, it is possible that not all the deaths were reported. As the enumerators would

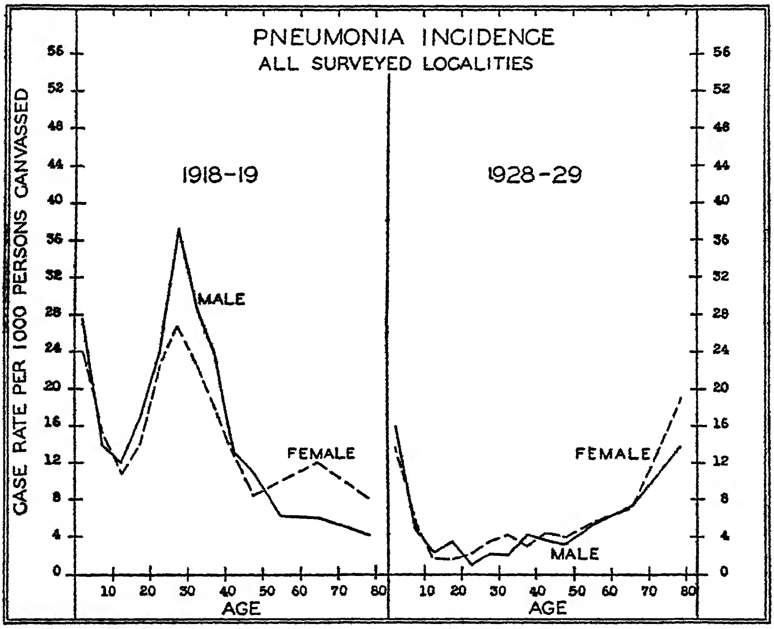

FIGURE 4.—Sex incidence of pneumonia morbidity in surveyed groups during the epidemics of 1928-29 and 1918-19

go about recording the name, age, sex, etc., of each member of the family who was living in the household at the time of the visit, the housewife might easily fail to include an individual who had died one or two months before. Deaths of nonresidents would never be included in the data from the canvasses. Boarding and lodging houses were not canvassed. (*d*) Families known to have recently had deaths may have been avoided to some extent by the enumerators.

Because of these possibilities of error, it might be well to compare the influenza and pneumonia mortality in the canvassed groups with that in the whole city in which the group is located and with mortality in a larger group of cities for which weekly data are available. Con-

sidering first the 1928–29 epidemic, the death rate in the canvassed population of 1.05 per 1,000 from influenza or pneumonia as a primary or secondary cause [3] and of 0.96 per 1,000 as primarily due to influenza or pneumonia during an average period of approximately three months may be compared with a rate of 0.86 per 1,000 during a period of 12 weeks covering the epidemic in a group of 35 large cities in the United States. This total rate of 0.86 represents an excess rate of 0.41 per 1,000 over the normal or median rate (1). In a group of 95 cities distributed throughout the United States, the total death rate from influenza and pneumonia during the same period was 0.89 and the excess rate 0.44 per 1,000, or only slightly greater than the corresponding rates in the 35 cities (3). It would seem from these data that influenza and pneumonia mortality in the canvassed population of the surveyed localities of 1928–29 is probably a little higher than the average for a more widely distributed group of cities.

Turning to the more specific problem of whether the death rate in the canvassed population in each of these cities is representative of the city as a whole, death rates from the city as a whole have been computed for each of the 10 large cities included in the 1928–29 survey. With the exception of two cities, the death rate from influenza and pneumonia as computed from registered deaths throughout the city is greater than the rate as reported to the enumerators in the surveyed population. In some instances the discrepancy is quite large. Considering the 10 cities as a unit, the rate (including deaths due primarily or secondarily to influenza or pneumonia) in the cities as a whole is 31 per cent greater than the corresponding rate in the canvassed groups. If only the deaths due primarily to influenza or pneumonia be considered, the rate in the 10 cities is 14 per cent greater than the corresponding rate in the canvassed groups in these cities. The rate for deaths due primarily to influenza or pneumonia in the whole of the 10 cities is 2 per cent greater than the rate for deaths due primarily or secondarily to influenza or pneumonia in the canvassed groups. The latter rate as used in this study therefore closely approximates the usual statement of the influenza-pneumonia death rate in this group of cities as a whole.

Considering the 1918–19 epidemic, the death rate of 4.99 per 1,000 over an average period of approximately four months in the canvassed population may be compared to a rate of 5.04 during the four months from September to December in 35 large cities in the United States (1). Some of the canvassed groups were recanvassed to include January, and if the January deaths be included for the 35 cities also, the rate becomes 5.79 per 1,000 population. The addition of January makes the period considered in the 35-city group a five months'

[3] Deaths with pneumonia as a secondary cause as tabulated in this study are exclusive of pneumonia that was secondary to the acute communicable diseases of childhood, such as measles, whooping cough, etc.

period, whereas the average period in the canvassed population was a little over four months. It appears that the death rate as found in these canvassed groups is not greatly below that in the larger group of 35 cities in the United States.

Turning to the more specific problem of the 1918–19 death rate in each canvassed group and the death rate for a similar period in the city as a whole, comparisons made for six of the cities indicate that

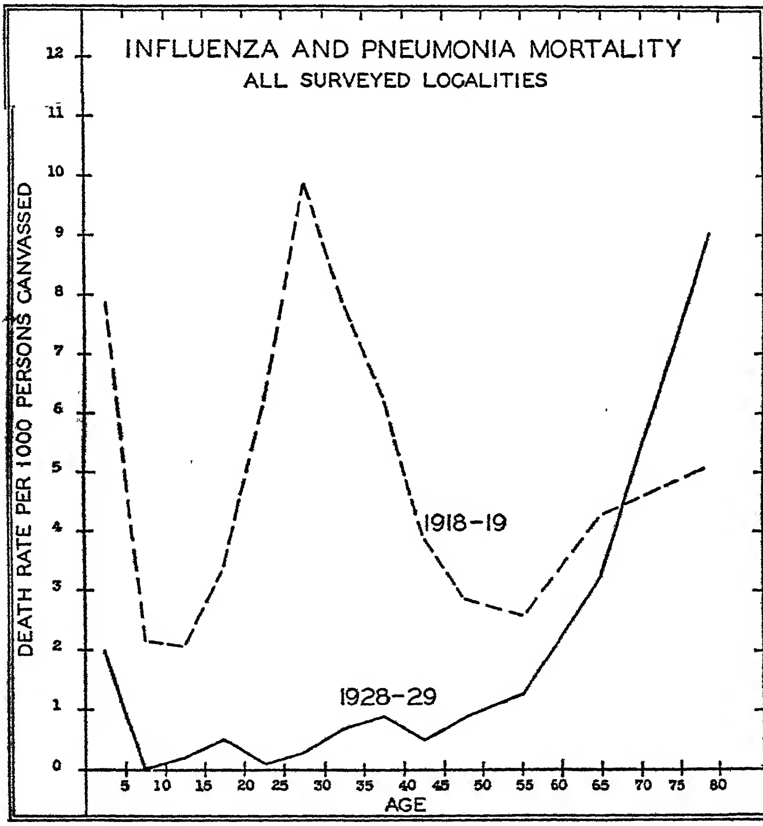

FIGURE 5.—Mortality from influenza and pneumonia at specific ages in surveyed groups during the epidemics of 1928–29 and 1918–19

the death rate in the canvassed population, based on the deaths reported in the survey, is in every case less than the corresponding rate based on deaths registered in the city as a whole. Considering the group of six cities as a unit, the death rate based on the registered deaths is 37 per cent higher than the death rate in the canvassed groups.

Figure 5 shows the age curve of the death rate from influenza and pneumonia in the canvassed localities of 1918–19 and in the canvassed

localities of 1928–29. The similarity of these curves to the corresponding curves already shown in Figure 3 for pneumonia incidence is immediately apparent. Inasmuch as about 20 or 25 per cent of the pneumonia cases are fatal, it might be expected that the curves would be similar. It is in the more severe cases that were complicated by pneumonia and in the deaths from influenza and pneumonia that the young adult peak of the 1918–19 age curve is particularly prominent. As in pneumonia incidence, there is no such peak in the 1928–29 mortality data. In some of the young adult age groups for 1928–29 the number of deaths was very small and the tendency toward two waves

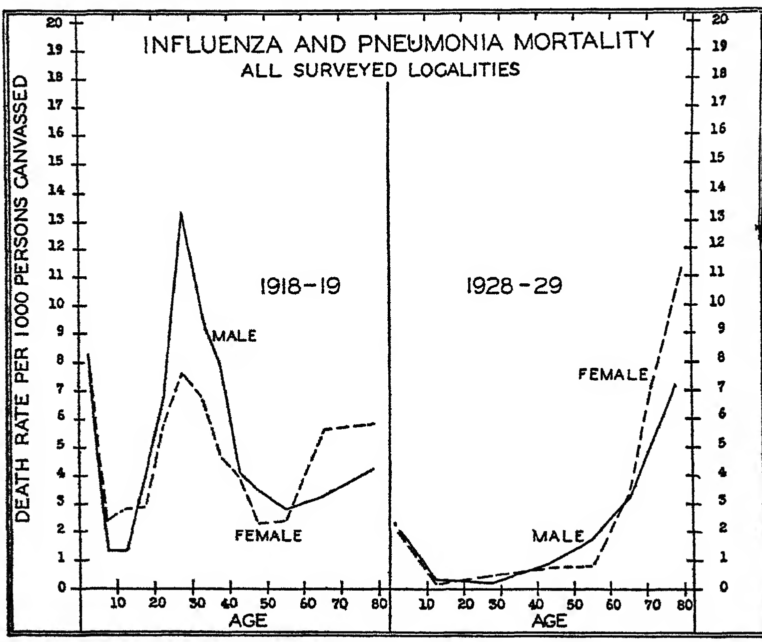

FIGURE 6.—Mortality from influenza and pneumonia among males and females in surveyed groups during the epidemics of 1928–29 and 1918–19

in the curve for these ages has no significance. Similar rates for the whole of the 10 cities show no such tendency.

Figure 6 shows by sex the age curves of influenza and pneumonia mortality in the two epidemics. Although the young adult peak of mortality in 1918–19 was considerably higher among males than among females, there is a very definite and significant peak in the mortality among females also. Whatever influence caused this high mortality among young adults was therefore important among women as well as among men. This is of particular interest in view of the fact that at this time many of the young adult males of the country were in the Army, and those who were living at home, and

included in the surveys, might have constituted a more or less selected group who were not in as good physical condition as those who had gone into the Army.

CASES COMPLICATED BY PNEUMONIA

The items that have already been discussed—total incidence, pneumonia incidence, and mortality—give the complete picture so far as the extent of the epidemic is concerned. However, the matter may be approached in another way, with particular reference to the severity of the cases that occurred.

Of the total cases in the 1918–19 epidemic, including the few doubtful cases, 6.3 per cent were complicated by pneumonia. Of the total cases in the 1928–29 epidemic, including colds that caused one or more days in bed, 2.6 per cent were complicated by pneumonia. Of the cases definitely reported as influenza or grippe, 3.3 per cent were complicated by pneumonia. In either case the pneumonia complications in 1928–29 would be only about half as frequent as in 1918–19.

Figure 7 shows the age curves of the percentage of cases complicated by pneumonia in the two epidemics. As in the case of pneumonia incidence, there is in the 1918–19 data a very definite peak for the age group 25 to 29 years, which appears to be absent from the 1928–29 curve. Although pneumonia incidence in the older ages was relatively low in 1918–19, it may be seen that the percentage of cases in the older age groups that were complicated by pneumonia is relatively high, but not so high as in young adults or children under 5 years of age. The 1928–29 curve is about what would be expected, a high per cent of the cases being complicated by pneumonia in the youngest and the oldest ages.

Figure 8 shows by sex the age curves of the percentage of cases complicated by pneumonia. The percentage of cases complicated by pneumonia in the 1918–19 epidemic was higher for males than for females between the ages of 10 and 40 years, the young adult peak being considerably more prominent among the males than among the females. After 50 years of age the percentage complicated by pneumonia was somewhat higher among women than among men. No significant difference between the sexes appears in the 1928–29 percentages.

CASE FATALITY OF ALL CASES

Another measure of the severity of the cases reported in the surveys is the case fatality, or the percentage of cases that were fatal. The numbers of deaths in the surveyed groups were not large, and these small numbers may be the source of considerable error in the figures. Case fatality rates seem particularly worth while, however, because they can be obtained only from such surveys as these; we have no

other way even to approximate the number of cases of influenzalike conditions that occurred during these epidemics. The routine reporting to health departments of nearly all the reportable diseases is recognized to be incomplete, and the incompleteness is no doubt much greater for influenza than for many of the other infectious diseases.

Considering all localities combined, 1.7 per cent of the total number of cases, including influenza, pneumonia, and doubtful, in the 1918–19

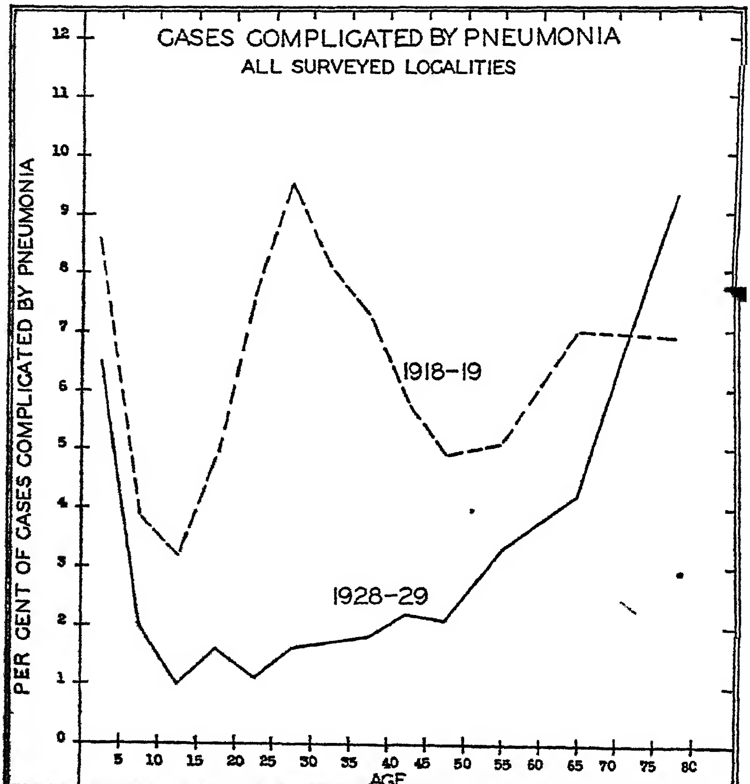

FIGURE 7.—Per cent of respiratory cases complicated by pneumonia among persons of different ages in surveyed groups during the epidemics of 1928–29 and 1918–19. (Respiratory cases include influenza, grippe, pneumonia, and colds with one or more days in bed)

epidemic were fatal. In the 1928–29 epidemic, 0.56 per cent of the cases of influenza, pneumonia, and severe colds causing one or more days in bed were fatal. If the severe colds be eliminated, and the deaths be related to the cases definitely reported as influenza, grippe, or pneumonia, the fatality would be 0.70 per cent. On the other hand, if the mild colds that did not cause the patient to go to bed be included in the cases, the deaths constitute 0.40 per cent of the total

respiratory cases. It may be seen that the fatality in the 1928–29 epidemic must have been less than one-half and probably nearer one-third or one-fourth of the 1918–19 fatality. The fact that the 1918–19 total incidence included severe colds has already been discussed; and in computing fatality, as in computing case incidence, colds involving one or more days in bed have been included in the total cases of the 1928–29 epidemic as more nearly approximating the 1918–19 category of influenza, grippe, pneumonia, and doubtful. In the section on mortality, the completeness of the deaths reported in these surveys was considered, and it will be remembered that the indications were that the deaths were not completely reported in

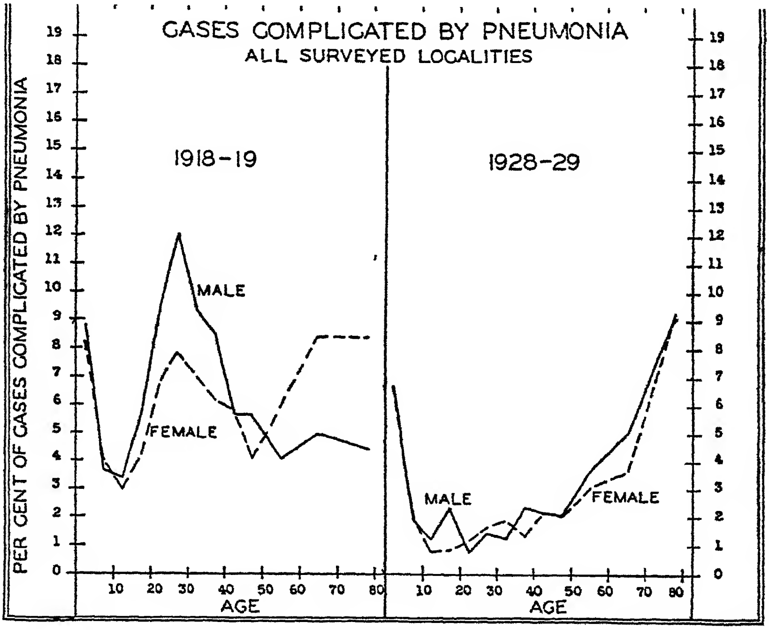

FIGURE 8.—Per cent of respiratory cases complicated by pneumonia among males and females in surveyed groups during the epidemics of 1928–29 and 1918–19. (Respiratory cases include influenza, grippe, pneumonia, and colds with one or more days in bed)

either of the surveys. The fatality figures quoted above would, therefore, be slightly smaller than would be expected with a more complete record of deaths in the canvassed population.

The case fatality varied considerably in the different localities. In 1918–19 the fatality rates in the surveyed localities ranged from 0.78 per cent in San Antonio to 3.14 per cent in New London. In the 1928–29 epidemic the range in fatality was from 0.12 per cent in San Francisco to 1.61 per cent in Pittsburgh. Even in Pittsburgh, with the highest fatality, the rate was less than the average fatality of 1.7 per cent in 1918–19.

Figure 9 shows by age the case fatality in the two epidemics. Although there are high fatalities in the 1918–19 epidemic for the ages under 5 and for young adults, it will be noted that the fatality is much higher in the older ages than in either of these younger groups. In 1928–29 the fatality was moderately high for children under 5 years,

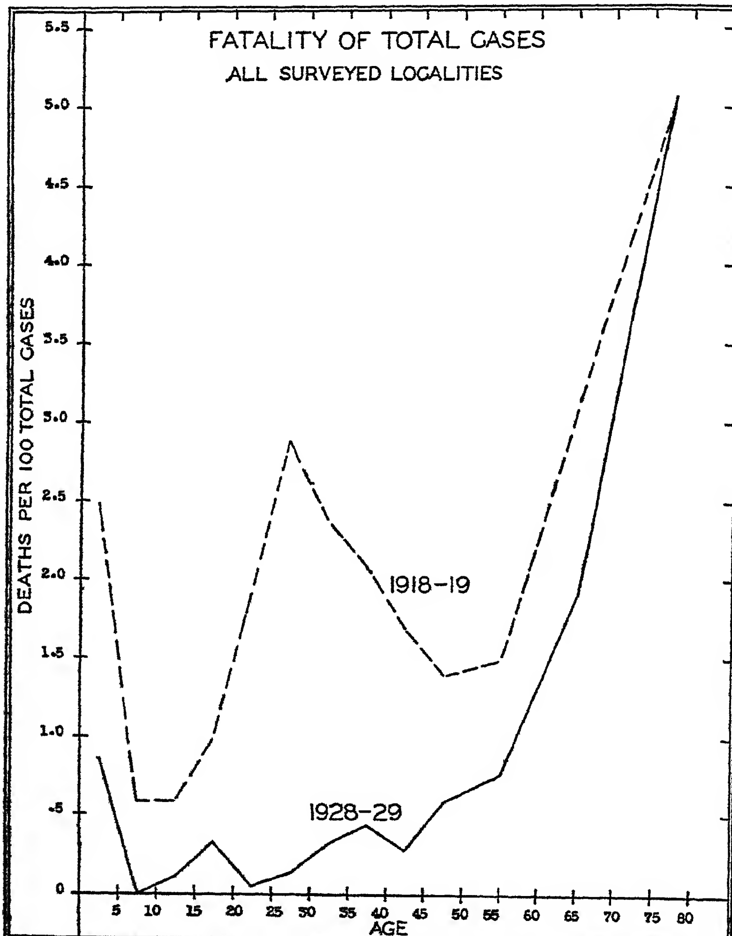

FIGURE 9.—Case fatality of respiratory illnesses among persons of different ages in surveyed groups during the epidemics of 1928–29 and 1918–19. (Respiratory cases include influenza, grippe, pneumonia, and colds with one or more days in bed)

but there is no young adult peak, the fatality tending to increase rather gradually after 5 years of age until at the oldest age group it is equal to the fatality in the 1918–19 epidemic.

Figure 10 shows fatality by sex. In 1918–19 the disease was more fatal among young adult males than among young adult females, although both sexes show a peak at 25 to 29 years. As in the instance

of the proportion of cases complicated by pneumonia, the fatality rate is higher for females over 60 years of age than for males of those ages. In the 1928–29 epidemic there are no differences between the sexes that could be said to be significant when the small number of deaths in the different age groups are taken into account.

PNEUMONIA FATALITY

Both the percentage of cases complicated by pneumonia and the case fatality are measures of the severity of respiratory cases that occur in a given epidemic. It is of interest, however, to find what

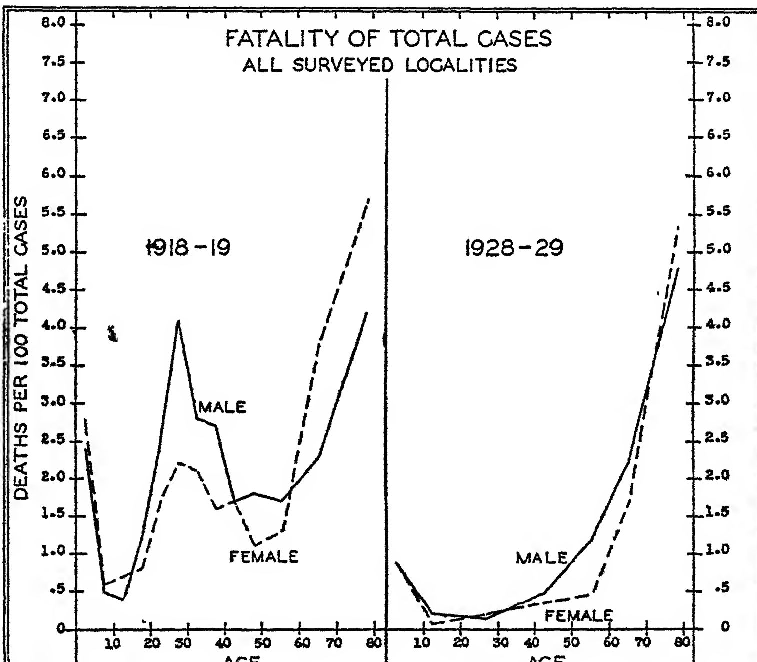

FIGURE 10.—Case fatality of respiratory illnesses among males and females in surveyed groups during the epidemics of 1928–29 and 1918–19. (Respiratory cases include influenza, grippe, pneumonia, and colds with one or more days in bed)

proportion of the cases that actually get to the pneumonia stage are fatal. It would seem that this figure would be somewhat more accurate than either the total case fatality or the percentage of cases complicated by pneumonia, inasmuch as the pneumonia cases would probably be fairly well recognized and reported with a fair degree of completeness.

During the 1918–19 epidemic, 25.5 per cent of the cases of pneumonia ended fatally. Not much more than one-third as many cases were complicated by pneumonia in the 1928–29 epidemic as in the 1918–19 epidemic, but of those cases that did reach the pneumonia

stage, 21 per cent were fatal—a figure not greatly different from the 25 per cent in the 1918–19 epidemic.

Figure 11 shows the age curve of pneumonia fatality in the two epidemics. Although there is in this curve for 1918–19 a young adult peak, it is much less marked than in pneumonia incidence, pneumonia complications, mortality or the total case fatality.

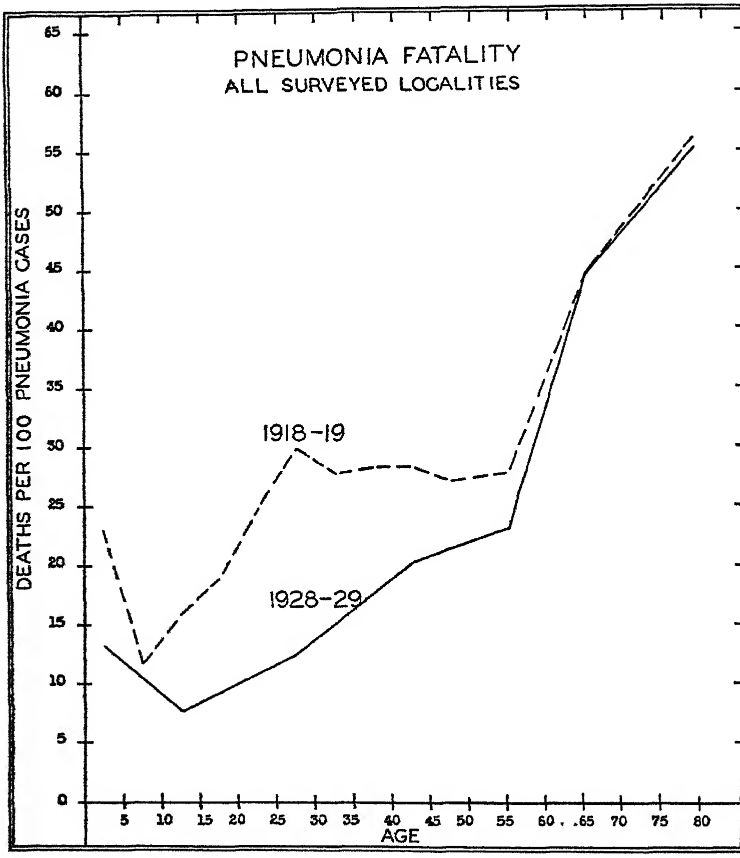

FIGURE 11.—Case fatality of pneumonia among persons of different ages in surveyed groups during the epidemics of 1928–29 and 1918–19

Figure 12 shows pneumonia fatality rates for each sex. In view of the rather small number of deaths, there do not appear to be any differences between the sexes in the 1928–29 data that are significant. The 1918–19 data include considerably more deaths; and although the differences are not much larger, they are probably more significant. From about 15 to 60 years of age the fatality of pneumonia seems to be slightly higher for males than for females. The young adult peak

at 25 to 29 years of age occurs to some extent in the males but appears to be absent from the curve for females.

REVIEW OF THE VARIOUS AGE CURVES

In the preceding graphs the various age curves have been compared on cross-section scales. This type of graph is useful, because it enables us not only to see the type of age curve but affords a comparison of the actual height of the rates at different ages in each epidemic. However, the considerable difference in the level of the curves leads to a possibility of some misinterpretation. To put the

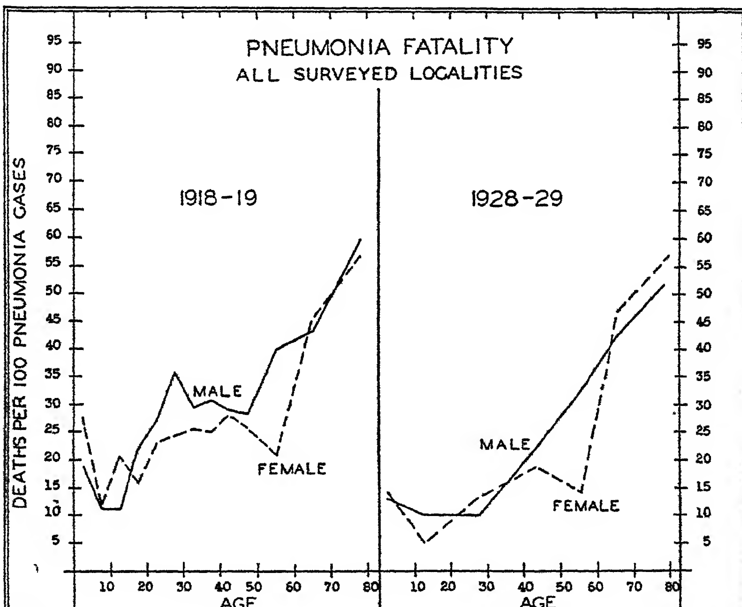

FIGURE 12.—Case fatality of pneumonia among males and females in surveyed groups during the epidemics of 1928-29 and 1918-19

various curves on the same basis so far as relative variation with age is concerned, they have been plotted on semilogarithmic charts in Figures 13 and 14. On a semilogarithmic graph an equal distance on the vertical or logarithmic scale indicates an equal percentage change in the rate, whether the rate be small or large. In Figure 13 the incidence rates of the various types of respiratory conditions including influenza, grippe, and colds as separate categories, are plotted for the two epidemics. In Figure 14 the ratios that measure the severity of the cases are plotted in a similar way.

Only a few things need be pointed out in connection with these graphs, as the data have been discussed in the preceding pages.

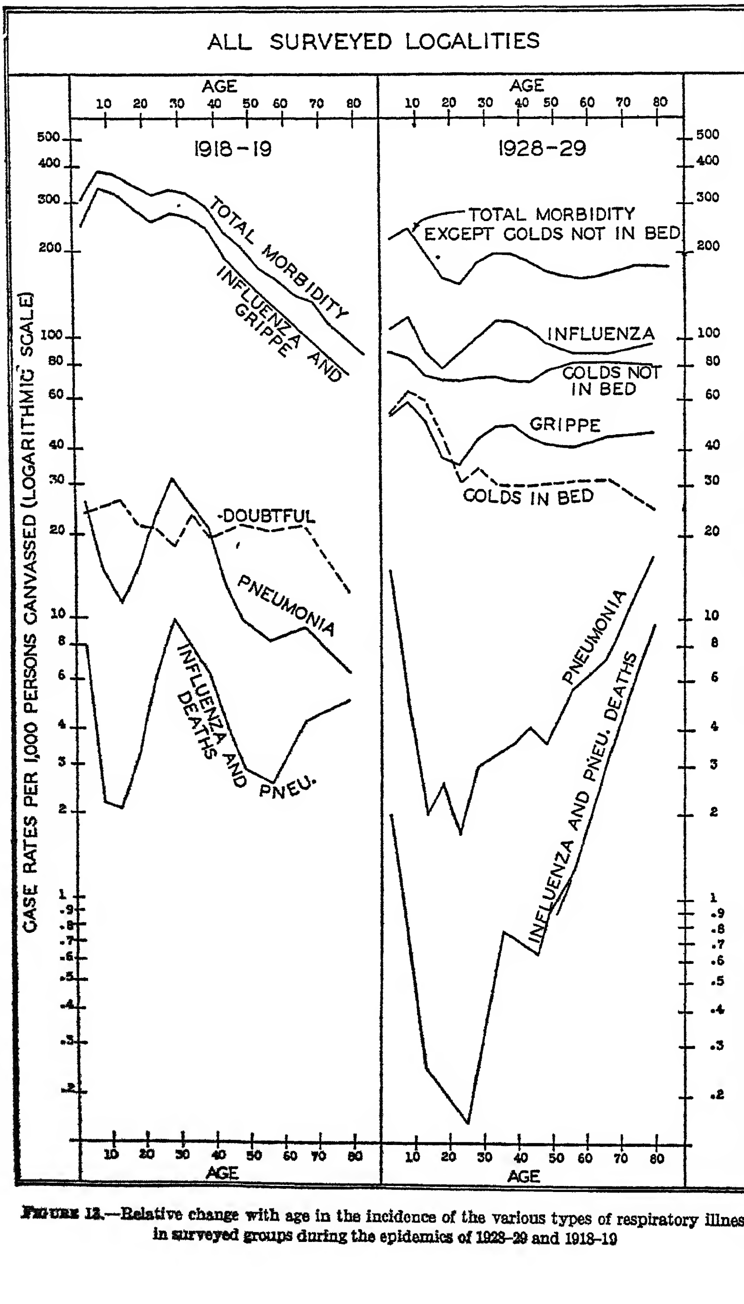

FIGURE 12.—Relative change with age in the incidence of the various types of respiratory illness in surveyed groups during the epidemics of 1928–29 and 1918–19

Mention has been made of the fact that the relative age incidence of cases designated in 1928–29 as grippe is identical with that of the cases designated as influenza. The age incidence of colds, however,

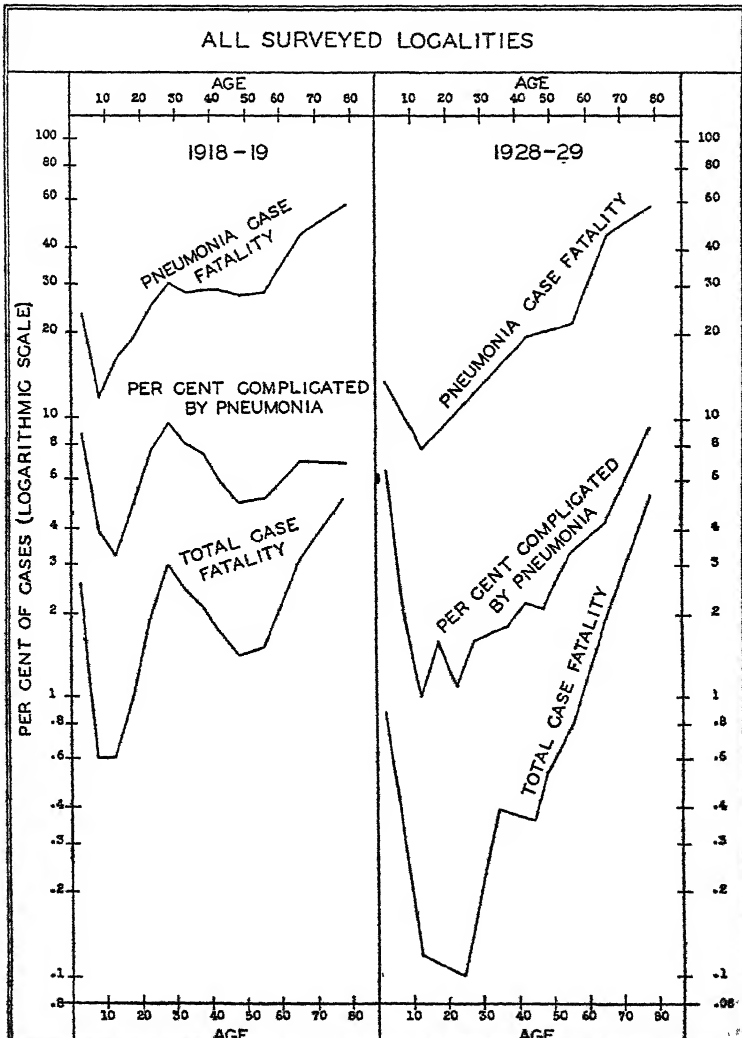

FIGURE 14.—Relative change with age in the severity of the various types of respiratory illness in surveyed groups during the epidemics of 1928–29 and 1918–19

is somewhat different. Similarly in 1918–19 the age incidence of cases designated as "doubtful" is rather different from that of cases designated as influenza or grippe, being somewhat like the cases reported

in 1928–29 in that the incidence did not decrease markedly as age increased.

SUMMARY

This study summarizes the age and sex variation in influenza and pneumonia morbidity and mortality during the 1928–29 and the 1918–19 epidemics. It is based on canvasses following each epidemic of families including nearly 150,000 persons in about 12 localities in the United States.

While there are some similarities in the 1928–29 and 1918–19 age curves, the differences are more striking than the similarities. The young adult peak in pneumonia incidence and in mortality in 1918–19 was absent in 1928–29.

Pneumonia incidence and the death rate were both much higher in 1918–19 than in 1928–29 but the percentages of pneumonia cases that were fatal were not greatly different in the two epidemics. There was a very large difference in the percentage of cases complicated by pneumonia in the two epidemics; but once pneumonia existed, the chance of fatal outcome was nearly the same in both years.

Statistical data of this kind give no clue as to the reason for the striking difference in age incidence in the two epidemics, and any attempt at explanation would be only conjecture.

ACKNOWLEDGMENTS

This study was made as one of a series of studies of influenza under the general direction of the United States Public Health Service Board for the Study of Respiratory Diseases, consisting of Consultant W. H. Frost, Principal Statistician Edgar Sydenstricker, and Senior Statistician Selwyn D. Collins. In the preparation of the study, the author has had the advice and assistance of the other members of this board and of the statistical staff of the Office of Statistical Investigations and associated offices of the Public Health Service.

The collection of the data for 1928–29 was done under the general direction of Surg. M. V. Veldee. In each city surveyed a medical officer of the United States Public Health Service who was already stationed in or near that city was designated to take charge of the collection of the data in his locality. All forms and instructions for enumerators and others engaged in the work were prepared in Washington and forwarded to the officers in charge, and so the procedure followed was reasonably uniform.

The 1918–19 data were collected in a similar way with Dr. W. H. Frost and Principal Statistician Edgar Sydenstricker in general charge of the surveys.

REFERENCES

(1) Collins, S. D., Frost, W. H., Gover, M., and Sydenstricker, E.: Mortality from influenza and pneumonia in 50 large cities in the United States, 1910–1929, Pub. Health Rep., vol. 45, No. 39, September 26, 1930. (Reprint 1415.)

(2) Sydenstricker, E.: The illness rate among males and females, Pub. Health Rep., vol. 42, No. 30, July 29, 1927. (Reprint 1172.)

(3) Collins, S. D.: Influenza-pneumonia mortality in a group of about 95 cities in the United States, 1920–1929. Pub. Health Rep., vol. 45, No. 8, February 21, 1930. (Reprint 1355.)

Preceding Papers on the Epidemiology of Influenza

Preceding papers from the Office of Statistical Investigations dealing with various phases of the epidemiology of influenza are listed below:

The incidence of influenza among persons of different economic status during the epidemic of 1918. By Edgar Sydenstricker. Pub. Health Rep., vol. 46, No. 4, January 23, 1931. (Reprint 1444.)

Mortality from influenza and pneumonia in 50 large cities of the United States, 1910–1929. By S. D. Collins, W. H. Frost, Mary Gover, and Edgar Sydenstricker. Pub. Health Rep., vol. 45, No. 39, September 26, 1930. (Reprint 1415.)

Influenza-pneumonia mortality in a group of about 95 cities in the United States, 1920–1929. By S. D. Collins. Pub. Health Rep., vol. 45, No. 8, February 21, 1930. (Reprint 1355.)

Morbidity in the influenza epidemic of 1928–29. By M. V. Veldee. Pub. Health Rep., vol. 44, No. 19, May 10, 1929. (Reprint 1282.)

The influenza epidemic of 1926. Pub. Health Rep., vol. 41, No. 34, August 20, 1926. (Reprint 1104.)

Variations in case fatality during the influenza epidemic of 1918. By Edgar Sydenstricker. Pub. Health Rep., vol. 36, No. 36, September 9, 1920. (Reprint 692.)

Statistics of influenza morbidity. By W. H. Frost. Pub. Health Rep., vol. 35, No. 11, March 12, 1920. (Reprint 586.)

Difficulties in computing civil death rates for 1918. By Edgar Sydenstricker and Mary L. King. Pub. Health Rep., vol. 35, No. 7, February 13, 1920. (Reprint 583.)

The epidemiology of influenza. By W. H. Frost. Pub. Health Rep., vol. 34, No. 33, August 15, 1919. (Reprint 550.)

Epidemic influenza in foreign countries. By W. H. Frost and Edgar Sydenstricker. Pub. Health Rep., vol. 34, No. 25, June 20, 1919. (Reprint 537.)

Influenza in Maryland. By W. H. Frost and Edgar Sydenstricker. Pub. Health Rep., vol. 34, No. 11, March 14, 1919. (Reprint No. 510.)

A comparison of the mortality rates by weeks during the influenza epidemic of 1889–90 and during the primary stageof the influenza epidemic of 1918 in 12 cities in the United States. Pub. Health Rep., vol. 34, No. 5, January 31, 1919. (Reprint 502.)

Preliminary statistics of the influenza epidemic. By Edgar Sydenstricker. Pub. Health Rep., vol. 33, No. 52, December 27, 1918.

DERMATITIS VENENATA DUE TO CONTACT WITH BRAZILIAN WALNUT WOOD

By Louis Schwartz, *Senior Surgeon, Office of Industrial Hygiene and Sanitation, United States Public Health Service*

In a cabinetmaking plant employing about 100 men there developed suddenly, early in February, a number of cases of dermatitis of the exposed parts. These cases occurred while the men were working on an order calling for the use of Brazilian walnut, the wood for which was purchased January 28, 1931. Cases continued to develop until a total of 11 had occurred. The symptoms varied in severity from a slight erythema and a few scattered papules and vesicles on the exposed parts to a very severe inflammation of the hands, forearms, entire face, and neck, accompanied by erythema, vesiculation, and edema severe enough to close the eyes. The disease affected mostly those who came in contact with the sawdust and those who sandpapered the wood. Inquiry among the workers also showed that there were many who, while they did not develop a dermatitis, did develop a coryza and sneezing while working in the room where the wood was being used. The length of time elapsing between the exposure to the wood and the development of the symptoms varied from two days to two weeks. The symptoms first noticed were a burning and itching of the face and eyelids, and in some cases the dermatitis was limited to these parts. In others it spread to the hands, forearms, neck, and other exposed parts. Most of the men who were affected continued working with the wood, and some of them had completely recovered from their symptoms within a few weeks. It seems, therefore, that a tolerance to the wood can be developed by some susceptible individuals if the exposure is continued. Two of the men had to give up their work for a while and one was still unable to work (in the latter part of March.)

The importer from whom the wood was purchased furnished a list of firms to whom he had sold the wood. Letters were written to these firms inquiring as to whether any cases of dermatitis had occurred in their plants while they were using the Brazilian walnut. Answers were received from 10 firms and nine of them replied that they had had cases of dermatitis among their workers which seem attributable to the Brazilian walnut. The number of cases reported by them varied. One firm stated that the majority of the workers were affected, while others stated that only one or two of those working with the wood were affected. One of these firms reported that it had discontinued using the wood because of the dermatitis that it caused among persons working with it.

The importer stated that while he was contemplating the importation of the wood, he had a laboratory investigate the possibility of danger in using it. Leaves from the tree, preserved in alcohol, were

shipped to him from Brazil, and an extract was obtained from these leaves for inoculation of susceptible workmen in order to make them immune to the poison from the wood. However, when it was found that only a very small percentage of the men were susceptible, it seemed simpler to arrange shop manipulations so that susceptible men would not come in contact with the wood. The importer said that no report of any severe cases of dermatitis among workers with Brazilian walnut had come to his attention, and that the cases which were reported occurred only when the firm was using the wood for the first time, after which the workers apparently became immune.

Samples of the wood, of the sawdust, and of the veneer were obtained and were taken to Clayton D. Mell, an authority on tropical woods, who identified the wood as "*embuia*," a species of *Nectandra.*

According to "Timbers of Tropical America," by Samuel J. Record and Clayton D. Mell, there are imported into this country under the trade name of "Brazilian walnut" two species of trees, *Cordia goeldiana* (commonly called "frei jorge"), and "*embuia*," a species of *Nectandra.* The former, according to Huber,[1] is a big tree of the forest of the Bragança Railway and it probably also grows in other parts of the country. Its wood is uniformly yellow-brown in color, with a golden luster in a proper light, but dull and mealy otherwise. It has a specific gravity of 0.60 and weighs 37 pounds to the cubic foot. It is strong, straight grained, coarse textured, easy to work, and takes a good finish. During the war, samples of logs were shipped to the United States for trial for gunstocks and airplane propellers under the name "Brazilian walnut." So far as known no cases of dermatitis were reported among workers with that wood.

The "*embuia*" is also called "*Embuia amarella,*" "*Embuia vermelha,*" and "*Canella imbuia.*" Its color varies from a yellowish to an olive or chocolate brown. It has a spicy and resinous odor and taste. It is moderately hard, has a specific gravity, air dry, of 0.70 to 0.76, and weighs 43 to 47 pounds per cubic foot. The grain is ordinarily straight, but sometimes it is curly. The wood is strong, easy to work, finishes smooth, and appears durable. The growth rings are distinct. The parenchyma is sparingly developed about the pores and is scarcely visible with the lens. The pores are small but visible, and fairly numerous but not crowded, occurring simply or more often in radial groups of two or three. The vessel lines are visible as fine dark lines, and the vessel contents are a dark gummy substance. The tree grows abundantly in southern Brazil. According to H. N. Whitford [2] these forests contain four well-defined stories. The first or upper cap consists of pines, 80 to 120 feet high; the second consists of 8 to 10 species of Lauraceae, 60 to 80 feet high, and one of these, the

[1] J. Huber: Mattas e Madeiras Amazonicas. *Bol. Mus. Goeldi,* 6, 201. 1909.

[2] Structure and Use of the Paraná Pine Forests of Brazil. *Journal of Forestry,* 17, 154–158, Feb. 1919.

"*embuia,*" comprises 50 per cent or more of the stand and is considered the timber *de luxe* of southern Brazil being used for many purposes, such as furniture, cabinet work, interior trimming, and construction.

Preparations were made for patch tests, using the sawdust of this wood in the following manner:

A piece of gauze about one-half inch square was moistened with water and its surface was completely covered with the sawdust. This gauze was placed on a larger piece of rubber dam, which, in turn, was placed on a larger piece of flannel. This was put on the skin of the back and kept in place by being completely covered with adhesive plaster. Three volunteers were patched, and after 24 hours there was a positive reaction under the patch in each case. This reaction varied from a mild erythema with a few vesicles which disappeared after 24 hours to a marked erythema in Case No. 2 which persisted for 72 hours and in Case No. 3 which persisted for over a week.

HISTORIES OF TYPICAL CASES

Case No. 1.—I. S., male, age 65, white, married. Cabinetmaker. Has been working for 10 years in the same plant. No history of skin eruptions until the present, which began on February 27, 1931. While working with a South American wood called Brazilian walnut, he developed a rash with severe itching on the back of the neck and face and also attacks of sneezing. Examination showed that the face, the eyelids, the ears, the chin, the neck, the bend of the elbows, and the scalp were the sites of an erythematous, papular, scaly eruption. The symptoms were so severe that he had to stop work.

Case No. 2.—L. N., male, age 52, white, married. Cabinetmaker. Has been working at the same plant for 12 years. No previous skin eruptions. On February 4, 1931, while working with Brazilian walnut, he developed a rash on the face and back of the neck accompanied by itching. Examination showed a butterfly shaped area of redness on the cheeks and nose with slight edema and a papular eruption on the back of the neck. He continued work and by March 9 was completely recovered.

Case No. 3.—J. J. S., male, age 48, white, married. Machinist. Worked 15 years for the same firm. Has never had any skin disease. On March 8, while working with Brazilian walnut, he developed a rash on both forearms and the face, with itching and burning. Examination showed an erythematous, edematous eruption of the face, nose, and eyelids, an erythematous papular eruption of the flexor surfaces of both forearms and back of neck. He continued to work although the symptoms were severe.

Case No. 4.—V. F., male, age 49, white, married. Carpenter. Had been working at the place three weeks. About two weeks after working with Brazilian walnut, he developed an itching and burning of the face, nose, and forehead. Examination showed a mild erythematous, edematous condition on the nose, forehead, and certain other parts of the face. He continued to work and is now well.

Case No. 5.—F. B., male, age 44, white, married. Cabinetmaker. Began working with Brazilian walnut March 21, 1931. The symptoms began March 24, 1931, with an itching and burning of the face and forearms. The condition spread over all the exposed areas of skin. On examination there was a disappearing erythema on the cheeks and flexor surfaces of arms and forearms. The face and eyelids were erythematous and swollen. He stopped work on April 3, 1931, and his condition improved but has not entirely disappeared.

EXTRACTS FROM LETTERS OF FIRMS USING BRAZILIAN WALNUT

"* * * The only case of any inflammation of the skin which has come up in our experience while using Imbuya wood has been in a man who was employed in our shop for a period of one week only, at the end of which time he reported sick and did not come back to work.

"Recently he applied for work and told us that his physician, on examination, diagnosed his case as a skin disease, but we have no manner of knowing whether this was caused by the wood he worked with or was just a natural case that might come up. * * *"

"* * * We have at one time used Brazilian walnut, but do not use it now.

"In checking our records we find, at the time walnut wood was used, that about 15 per cent of the men who worked with same had slight skin infections. * * *"

"* * * Last Saturday morning two of the men in the joining department complained of their skin itching and burning, and one man's eyes were partly closed, due to inflammation of the skin. This extended all over his face and down onto his neck and chest.

"I did not at that time know anything about the effect of this wood and received your letter in the Saturday afternoon mail and knew immediately that it was probably the result of our use of this wood.

"The one man most badly affected came in this morning [Tuesday] apparently all right, but had to leave by 11 o'clock as his eyes again started to bother him and the skin of his face became badly inflamed.

"The men who sawed and sanded this wood, however, have not been affected in this way, except that they all say that the dust from the wood makes them sneeze, but seems to have no inflammatory effect upon their skin. * * *"

"* * * The use of this wood has affected only about two [out] of [every] ten persons throughout our factory.

"In two instances, the men, through their eyelids swelling, would become partially blind. In both cases the skin of the face, arms, and hands would become blotchy, with white scales, and a very itchy condition would follow. Among other cases there was just a minor irritation of the skin.

"We sent several test samples to chemists in New York and they wrote back that there was no substance in the sawdust of the Brazilian walnut to cause any skin irritation; but, as above outlined, our personal experience proved to the contrary. * * *"

"* * * We have made use of Brazilian walnut from 1925 to 1929, and discontinued using same in 1929, due to the fact that the majority of our workers became afflicted with inflammation of the skin. * * *"

"* * * This wood should not be called Brazilian walnut but Imbuya wood. This wood was first introduced into this country about 10 or 12 years ago from Brazil and was then termed 'Brazilian walnut,' whereas its actual name is Imbuya * * *.

"During this time that we have been using this wood (which is about 12 years), we have had probably 25 cases of this skin eruption or itching, and it seems

peculiar that some men are affected and others are not. Some are affected on their forearms from the dust when sandpapering the wood; especially when they perspire and the dust settles on their arms. Others have had this eruption and itching on their face and neck or exposed parts when working.

"About eight years ago we went so far as to communicate with Brazil and obtained some leaves of this tree, trying to get some doctor or institution to make a culture from it, but found very little resulted from it.

"It almost seems that our men have become inoculated with this germ, as very rarely do we hear any complaints now, and as a matter of fact we have been using more of this wood during the last four months than we have ever used. Mr. B.'s case was probably the only one, with possibly an exception of a minor case. * * *

"This wood is very desirable and probably the most useful one which has been introduced into this country from Brazil, and is used for work of a large variety.

"We again repeat that the men who become affected are the ones who perspire freely, the dust and chips from this wood coming in contact with the exposed parts of their body.

"B. works on a molding machine and in this way comes in contact with flying chips from the machine striking his skin, rather than from sandpapering dust, which is more severe * * *."

"* * * Two or three years ago, we did use a considerable quantity of this wood, and we did have some complaints from workers of a skin inflammation. This seemed to be limited to a very small proportion of the men who seemed susceptible to this irritation, the majority not being affected in any way.

"The irritation seemed most noticeable in warm weather, when the workers were perspiring freely and chiefly among those that were sandpapering, where a fine dust was spread in the air.

"We have discontinued the use of this wood. * * *."

"* * * We did one job in this lumber two years ago for a period of about five months.

"During this time we found no serious skin trouble among our employees. There was however, one case of blood poisoning of the arm where a man ran a splinter of this wood into his hand. * * *"

"* * * With reference to any cases of inflammation of the skin occurring among our cabinetmakers working on furniture made of Brazilian walnut, we beg to advise that we have used this wood for the past 12 years and during that time two or three of our men have been affected in this manner, but these are rare instances.

"Men who usually work in this wood are not affected by it. * * *"

SUMMARY

Eleven cases of dermatitis venenata occurred among 100 workmen in a cabinetmaking plant due to contact with Brazilian walnut ("*embuia*," species of *Nectandra*), especially in persons exposed to the

sawdust. Cases also occurred in 9 out of 10 other plants using the wood. Tolerance is developed as a rule.

Patch tests with sawdust from this wood on three volunteers showed positive reaction in each case.

AN IMPORTANT SOURCE OF ORIGINAL RAT INFESTATION ON NEWLY CONSTRUCTED VESSELS

By B. E. Holsendorf, *Chief Pharmacist, United States Public Health Service*

On account of the importance of obtaining accurate information as to the source and manner of the original rat infestation of vessels, and realizing what an important rôle this information can be made to play in the work of prevention and control of rat life on ships, a careful check has been kept on 48 new vessels during a period of four years. The quarantine inspectors inspected each vessel upon its arrival in New York on its maiden voyage, and follow-up inspections have been made practically each trip thereafter for the full period that the vessel has been in commission. On 43 of these a record of each inspection was kept so that the history of rat activity or nonactivity is practically complete. These inspections revealed the fact that 29 of these 48 vessels had become rat-infested in the shipyards during construction. These yards were located in the United States, Great Britain, Germany, France, Holland, Italy, Sweden, Norway, and Spain.

Six of the infested ships were constructed in Italian yards, 3 in those of Great Britain, 3 in German plants, 10 in those of the United States, 2 in French shipyards, 3 in those of Spain, and 2 in Holland.

The 19 vessels that remained rat free during construction were built in the different countries as follows: Six in Great Britain, 4 in the United States, 6 in Germany, 1 in Spain, and 2 in Sweden.

Of the 19 new ships that came out of the shipyards in a rat-free condition, 18 have continued to be free from rodents for the entire time that they have been in commission, periods ranging from 4 months to 3 years, the average time being about 14 months. Thirteen of these rat-free ships included rat-proofing work in their building program and had a large percentage of this work done during construction. On seven vessels the rat proofing was completed before they left the shipyards.

There is no record of two vessels. These ships have not touched at New York since being placed in commission. One is in service on the west coast and the other is a United States cruiser.

Of the 29 ships that were infested in the shipyards, on only 4 had anything like a complete rat-proofing program been carried out, on 8 a limited amount of rat proofing had been done while under construc-

tion, and on the remaining 17 little or no rat proofing had been done while they were being built. Included in this number was a large passenger ship of the French Line, 5 large Italian passenger ships, 6 Spanish steamers, a large steamer of the Holland-America Line, and 2 were aeroplane carriers of the U. S. Navy.

The infestation found varied from a few stray rats, localized in material or supplies, to an extensive infestation, where the rodents were securely intrenched in the harborage existing in cargo spaces, living quarters, galleys, storerooms, and similar places. In some instances it required more than a year to break up and control the rat colony life on board. This was especially true on two French vessels, a large Swedish passenger ship, the Italian passenger vessels, one American passenger ship, and two of the Spanish ships.

Eighteen of the 29 infested ships that have been under observation have become rat-free and have so remained for long periods. On 6 of them the rat population has been reduced to a negligible number. These 24 vessels started their rat proofing operations very shortly after being commissioned, and completed the work that had been initiated and partly done in the shipyards or embarked on a new program of rat proofing which embraced the progressive elimination of harborage in every compartment. As a result, the rats were literally "built out" on many of these ships. On the remaining five of the 29 yard-infested ships there is no record, no inspection having been made of them since they left the shipyards; 4 of these are naval vessels.

The data thus collected would seem to show rather conclusively that a very large percentage of vessels become infested with rats in the shipyards while being constructed, and that many of them continue to harbor rats for long periods or indefinitely thereafter, and that this condition obtains very generally throughout the world.

It further shows that vessels on which very little or no rat-proofing work had been done during construction, the incidence of rat infestation was more frequent, more extensive, and persisted for longer periods. (Outstanding examples are the large French steamer, 4 Italian steamers, 2 Spanish ships, 1 American passenger vessel, 1 Swedish passenger ship, and 1 Dutch steamer.)

The histories of the 19 new ships that left the shipyards without being infested and have remained rat-free (several for periods of three years), notwithstanding the fact that they had touched at eastern and oriental ports and had carried rat food and rat-attractive cargoes, would seen to indicate that, if initial shipyard infestation can be prevented by reduction of harborage to a minimum during construction, most ships can be kept free of rat colony life.

Of the several American shipyards inspected, all were found to be more or less rat-infested and had been so for years. From information

obtainable it appeared that nearly all of the ships that had been constructed in these yards in years past had become infested with rats before being completed. No attention was paid to the matter at that time and no efforts were made to prevent infestation.

The necessity for better control of rat life in the shipyards and for taking effective measures to prevent infestation of ships under construction is now fully recognized by the leading American shipbuilding plants.

While it is known that there are other ways in which ships become rat-infested, there being a record of 2 new ships and 3 reconditioned ones that have come under my personal observation, in which it was definitely known that some rats had come on board by means of gangplanks on the lower level, and in two instances in cargo, the fact that 133 ships known to be free from rats have been kept entirely rat-free for long periods, notwithstanding the fact that following rat proofing they were carrying the same kind of cargo as they had carried formerly and touched at the same ports, would seem to indicate very clearly that the major source of original infestation is not from wharves or cargoes but from shipbuilding plants and repair yards.

NEW YORK STATE REGULATION AGAINST POISONOUS SUBSTANCES FOR POLISHING KITCHENWARE OR SILVERWARE

On November 6, 1929, the Public Health Council of New York State added regulation 18 to chapter 7 of the Sanitary Code. This regulation, as originally adopted, provided that—

Any polish or article or substance containing any cyanide preparation or other poison shall not be used in any hotel, club, restaurant, or public eating place for the cleaning of nickel, copper, silverware, or silver-plated ware or other articles or utensils used for the service or preparation of food or foodstuffs.

On June 30, 1931, the council amended the above regulation by adding a paragraph restricting the sale of the substances mentioned; also the regulation was made applicable to public institutions. Said regulation, as amended, now reads as follows:

No polish or article or substance containing any cyanide preparation or other poison shall be sold or offered for sale when such sale is obviously or presumably for the cleaning of nickel, copper, silverware, or silver-plated ware or other articles or utensils used for the service or preparation of food or foodstuffs in any hotel, club, restaurant, public institution, or public eating place.

No polish or article or substance containing any cyanide preparation or other poison shall be used for the cleaning of nickel, copper, silverware, or silver-plated ware or other articles or utensils used for the service or preparation of food or foodstuffs in any hotel, club, restaurant, public institution, or public eating place.

Regulations pertaining to poisonous polishes have also been adopted in New York City and Chicago.

COURT DECISION RELATING TO PUBLIC HEALTH

Sexual sterilization law held valid.—(Idaho Supreme Court; State *v.* Troutman, 299 P. 668; decided May 20, 1931.) The State board of eugenics, acting under the sterilization law (ch. 194, Laws 1925, as amended by chs. 68 and 285, Laws 1929), found, after hearing, that the defendant was afflicted with congenital feeble-mindedness and recommended sterilization by vasectomy. The findings, conclusions, and order of the board were reviewed by the district court and the board's recommendations were sustained. On appeal to the supreme court, the constitutionality of the statute was challenged.

One of the claims was that the law was in conflict with section 1 of article 1 of the State constitution which guaranteed life, liberty, and the pursuit of happiness and safety, and also in conflict with the similar guaranty to citizens of the United States under the fourteenth amendment to the Federal Constitution. Concerning this, the court said:

> * * * The Supreme Court of the United States, considering a very similar sterilization law of Virginia, held the law was a reasonable act protective of the general welfare within the police power of the State and not in contravention of such constitutional guaranties. Buck *v.* Bell, 274 U. S. 200, 47 S. Ct. 584, 71 L. Ed. 1000. We are in accord with that view.

With reference to a claim that the law violated section 6 of article 1 of the State constitution, prohibiting cruel and unusual punishment, the court declared that "The operation known as vasectomy is not usually considered cruel or inhuman, nor is it, under the Idaho law, inflicted as a punishment."

Another contention of the defendant was that due process of law was not afforded, but the court rejected this, saying:

> * * * The proceeding is pursuant to summons duly issued and served, and every safeguard known to a regular and orderly hearing in a court with right of appeal is afforded. The act not only affords due process but unless written assent is procured requires a complete open judicial proceeding.

Answering the contention that the constitutional safeguards in a criminal prosecution were violated, the court found that the instant proceeding was in no sense a criminal prosecution.

It was further claimed that section 1 of article 2 of the State constitution, segregating the departments of government, was violated,

in that the sterilization law attempted to delegate judicial powers to an executive board. Regarding this the court stated that the eugenics board's findings and conclusions were only recommendatory, that the person concerned could give or withhold written consent thereto, and that, if written consent were not given, the board was required to proceed in court where a purely judicial proceeding was had with complete final determination of all rights in the courts. This, the court held, was not an infringement upon the province of the judicial department.

The final contention was that the act was unconstitutional because discriminatory, in that it did not afford equal protection of the law to all. In rejecting this claim the court declared that the sterilization law did not create a class or discriminate against any within the class affected. It stated that sterilization acts of certain other States had been held unconstitutional where applicable only to inmates of State institutions, but cited decisions of the Virginia Supreme Court of Appeals and of the United States Supreme Court holding that even that restriction did not render the law unconstitutional. The court pointed out, however, that the act involved in the instant case applied to all coming within the class defined, whether in State institutions or not.

The judgment of the district court was affirmed.

DEATHS DURING WEEK ENDED JULY 25, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended July 25, 1931; and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended July 25, 1931	Corresponding week, 1930
Policies in force	75, 023, 856	76, 003, 866
Number of death claims	13, 054	14, 064
Death claims per 1,000 policies in force, annual rate	9. 1	9. 6
Death claims per 1,000 policies, first 30 weeks	10. 3	10. 0

Deaths [1] from all causes in certain large cities of the United States during the week ended July 25, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended July 25, 1931				Corresponding week, 1930		Death rate [2] for the first 30 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,029	10.3	579	[4] 44	11.9	805	12.7	12.6
Akron	31	6.3	3	30	12.0	10	8.1	8.2
Albany [5]	23	9.3	6	119	13.1	2	14.4	15.4
Atlanta	85	16.0	12	123	17.1	15	15.9	16.8
White	37		6	95		9		
Colored	48	(6)	6	172	(6)	6	(6)	(6)
Baltimore [5]	187	12.0	12	41	18.5	26	15.2	14.6
White	150		10	43		16		
Colored	37	(6)	2	31	(6)	10	(6)	(6)
Birmingham	49	9.5	9	91	12.8	12	14.4	14.4
White	22		2	34		4		
Colored	27	(6)	7	170	(6)	8	(6)	(6)
Boston	175	11.6	19	54	12.5	23	14.9	15.0
Bridgeport	28	9.2	2	33	9.9	1	11.8	12.1
Buffalo	121	10.9	10	41	11.3	12	13.9	13.6
Cambridge	19	8.7	1	20	5.5	2	12.9	12.5
Camden	17	7.4	4	70	18.0	10	15.0	14.3
Canton	18	8.8	3	69	8.9	1	10.6	10.6
Chicago [5]	623	9.4	65	57	9.8	42	11.4	10.9
Cincinnati	125	14.3	6	36	18.6	18	16.7	16.1
Cleveland	176	10.1	20	58	11.3	19	11.8	11.8
Columbus	72	12.7	2	20	17.4	9	14.4	16.8
Dallas	63	12.1	13		10.9	10	12.0	12.0
White	49		12			5		
Colored	14	(6)	1		(6)	5	(6)	(6)
Dayton	47	11.8	6	84	11.3	4	12.6	10.5
Denver	90	16.1	7	68	12.6	7	14.7	15.0
Des Moines	32	11.5	1	18	10.2	2	11.8	12.3
Detroit	208	6.6	19	30	8.2	37	8.9	10.0
Duluth	18	9.2	0	0	12.8	4	11.0	11.7
El Paso	29	14.4	11		17.2	7	16.9	18.5
Erie	14	6.2	1	19	13.0	2	10.8	11.6
Fall River [5 7]	12	5.4	1	23	12.2	3	12.2	12.9
Flint	18	5.7	4	51	5.3	4	7.6	9.5
Fort Worth	32	10.0	6		10.2	1	11.4	11.4
White	23		4			1		
Colored	9	(6)	2		(6)	0	(6)	(6)
Grand Rapids	26	7.9	1	15	8.3	2	9.5	11.0
Houston	60	10.1	6		9.2	8	11.6	12.7
White	34		4			4		
Colored	26	(6)	2		(6)	4	(6)	(6)
Indianapolis	104	14.7	9	74	13.0	9	14.5	14.9
White	87		6	56		7		
Colored	17	(6)	3	201	(6)	2	(6)	(6)
Jersey City	67	11.0	9	80	10.7	9	12.3	12.0
Kansas City, Kans.	15	6.4	0	0	12.4	1	13.5	11.5
White	9		0	0		1		
Colored	6	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo.	90	11.5	7	53	15.1	13	14.1	13.6
Knoxville	15	7.2	3	64	12.2	7	13.2	14.4
White	9		2	48		5		
Colored	6	(6)	1	204	(6)	2	(6)	(6)
Long Beach	28	8.9	3	72	10.1	1	10.1	10.0
Los Angeles	238	9.4	17	49	8.7	24	11.2	11.4
Louisville	69	11.7	4	34	12.9	8	15.1	13.8
White	53		4	39		7		
Colored	16	(6)	0	0	(6)	1	(6)	(6)
Lowell [7]	21	10.9	3	76	11.9	0	13.2	14.4
Lynn	21	10.7	0	0	11.2	3	10.5	11.3
Memphis	80	16.1	5	53	12.9	10	17.1	18.2
White	43		4	67		7		
Colored	37	(6)	1	29	(6)	3	(6)	(6)
Miami	23	10.7	1	25	13.2	1	12.5	11.9
White	16		1	35		0		
Colored	7	(6)	0	0	(6)	1	(6)	(6)

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended July 25, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended July 25, 1931				Corresponding week, 1930		Death rate for the first 30 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Milwaukee	95	8.4	10	43	8.3	7	10.0	10.1
Minneapolis	107	11.8	5	32	7.9	5	12.0	10.9
Nashville	46	15.4	7	104	17.9	8	17.3	16.9
White	28		3	60		5		
Colored	18	(6)	4	236	(6)	3	(6)	(6)
New Bedford[7]	25	11.6	4	106	11.6	1	13.1	11.9
New Haven	43	13.8	5	95	10.3	5	12.6	13.8
New Orleans	138	15.4	13	71	13.7	21	17.7	18.3
White	73		6	50		11		
Colored	65	(6)	7	114	(6)	10	(6)	(6)
New York	1,265	9.3	79	33	11.5	143	11.9	11.6
Bronx Borough	170	6.7	9	20	9.1	17	8.7	8.4
Brooklyn Borough	431	8.6	33	35	10.4	56	11.0	10.6
Manhattan Borough	473	13.6	32	55	16.8	56	18.2	17.2
Queens Borough	146	6.6	4	11	7.5	12	7.7	7.5
Richmond Borough	45	14.4	1	18	16.0	2	14.2	14.9
Newark, N. J.	62	9.6	5	26	9.3	7	12.4	12.9
Oakland	55	9.8	2	26	9.9	5	10.9	11.3
Oklahoma City	36	9.5	3	41	13.6	9	11.6	10.7
Omaha	49	11.8	5	56	17.5	6	14.4	14.3
Paterson	36	13.5	5	86	8.7	1	14.1	12.9
Peoria	23	11.1	0	0	11.4	0	13.5	12.9
Philadelphia	401	10.6	28	41	14.9	62	14.1	13.2
Pittsburgh	144	11.1	18	62	12.5	17	15.6	14.6
Portland, Oreg.	84	14.3	3	36	10.2	3	12.1	12.9
Providence	54	11.0	6	55	11.9	4	13.5	14.0
Richmond	60	17.0	5	73	20.5	9	16.4	15.7
White	43		4	88		2		
Colored	17	(6)	1	43	(6)	7	(6)	(6)
Rochester	48	7.5	2	18	10.9	4	12.6	12.1
St. Louis	202	12.7	8	27	16.6	23	16.5	15.1
St. Paul	41	7.7	0	0	8.4	3	11.4	10.7
Salt Lake City[5]	18	6.6	0	0	7.4	1	12.5	13.1
San Antonio	46	10.0	4		15.9	16	15.5	18.1
San Diego	40	13.3	1	20	15.3	3	14.2	14.9
San Francisco	135	10.8	7	46	15.6	5	13.3	13.5
Schenectady	19	10.3	2	59	12.0	2	10.8	11.8
Seattle	77	10.8	1	9	9.2	1	11.9	11.3
Somerville	10	5.0	0	0	3.5	0	9.8	10.4
South Bend	21	10.1	1	25	7.0	1	8.7	9.4
Spokane	24	10.8	2	52	10.4	1	12.6	12.9
Springfield, Mass.	32	11.0	1	15	7.6	3	12.6	12.9
Syracuse	43	10.5	3	36	9.2	6	12.2	12.2
Tacoma	21	10.2	1	26	13.2	0	12.8	12.8
Toledo	56	9.9	6	55	14.5	5	12.6	13.3
Trenton	32	13.5	2	35	17.7	4	17.5	17.1
Utica	16	8.2	1	26	13.8	2	14.6	15.8
Washington, D. C.	118	12.5	12	66	19.4	23	16.5	15.8
White	71		4	33		10		
Colored	47	(6)	8	138	(6)	13	(6)	(6)
Waterbury	13	6.7	2	60	10.4	1	10.1	10.5
Wilmington, Del.[7]	25	12.2	4	86	14.7	2	14.7	14.9
Worcester	40	10.6	4	55	11.7	4	13.0	13.7
Yonkers	14	5.3	0	0	6.5	2	9.0	8.4
Youngstown	30	9.0	1	14	10.4	1	11.0	10.5

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 77 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color, the percentage of colored population in 1930 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 1, 1931, and August 2, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 1, 1931, and August 2, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930
New England States:								
Maine	3	5	1	---	11	14	0	0
New Hampshire	---	4	---	---	4	7	0	0
Vermont	---	1	---	---	1	6	0	0
Massachusetts	25	27	2	2	93	94	3	0
Rhode Island	5	2	1	---	35	2	0	0
Connecticut	8	4	2	1	28	10	0	2
Middle Atlantic States:								
New York	69	66	[1] 4	[1] 2	389	291	9	11
New Jersey	12	26	---	2	65	113	0	7
Pennsylvania	42	55	---	---	214	254	5	5
East North Central States:								
Ohio	27	38	3	3	263	55	1	5
Indiana	13	7	7	1	14	8	2	5
Illinois	54	66	133	17	200	18	8	11
Michigan	22	15	---	---	62	60	3	8
Wisconsin	12	10	8	2	83	88	1	4
West North Central States:								
Minnesota	3	11	2	1	17	38	2	2
Iowa	4	---	---	---	5	---	0	0
Missouri	8	13	---	---	4	16	5	5
North Dakota	4	---	---	---	10	1	0	0
South Dakota	1	1	---	---	1	9	0	1
Nebraska	2	7	---	---	2	6	0	0
Kansas	5	6	---	4	6	22	0	1
South Atlantic States:								
Delaware	2	---	---	---	3	3	0	0
Maryland [2]	12	9	1	2	19	11	1	1
District of Columbia	9	4	---	1	9	20	1	0
Virginia	---	---	---	---	---	---	---	1
West Virginia	3	5	6	8	59	28	3	0
North Carolina	17	34	---	---	18	15	2	2
South Carolina	6	24	47	47	29	---	2	2
Georgia [3]	4	---	6	7	7	19	0	1
Florida [3]	6	6	---	---	5	4	1	2
East South Central States:								
Kentucky	---	---	---	---	42	4	2	1
Tennessee	1	3	2	1	2	5	1	3
Alabama [3]	7	5	2	1	9	13	1	2
Mississippi	14	6	---	---	---	---	1	0

Footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 1, 1931, and August 2, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930
West South Central States:								
Arkansas	1	1		2	5	1	0	0
Louisiana	15	6	4	2		3	0	3
Oklahoma [4]	4	6	7		1		0	2
Texas [3]	4	33	5		6	6	0	1
Mountain States:								
Montana		1			22		0	2
Idaho	1	1			2	2	2	0
Wyoming					3	1	0	0
Colorado	7	5			23	18	0	0
New Mexico	2	6		1		8	0	0
Arizona	2				4	13	0	0
Utah [2]	1		7		6	3	1	6
Pacific States:								
Washington	1	3			14	40	2	3
Oregon		3	4	2	13	26	1	1
California	45	35	8	10	90	158	0	5

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 12 cases; 3 cases in Georgia; 5 cases in Florida; 1 case in Alabama; and 3 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930
New England States:								
Maine	4	0		4	0	0	0	6
New Hampshire	1	0	0	1	0	0	6	0
Vermont	0	0	1	1	3	0	0	0
Massachusetts	25	13	81	41	0	0	8	6
Rhode Island	8	2	5	4	0	0	2	0
Connecticut	37	1	7	7	0	0	4	2
Middle Atlantic States:								
New York	433	13	108	70	2	0	24	18
New Jersey	16	2	49	17	0	0	6	3
Pennsylvania	1	1	75	78	0	1	16	40
East North Central States:								
Ohio	1	12	92	97	17	21	32	46
Indiana	0	2	18	20	19	40	12	15
Illinois	15	4	68	52	15	19	25	46
Michigan	13	2	66	47	6	25	5	7
Wisconsin	11	1	16	21	1	2	3	2
West North Central States:								
Minnesota	10	10	20	18	1	4	3	2
Iowa	1	4	9	8	11	22	1	4
Missouri	2	3	13	16	1	15	38	25
North Dakota	0	0	6	6	13	11	3	0
South Dakota	0	2	1	2	1	1	4	3
Nebraska	0	0	13	1	4	10	5	7
Kansas	0	6	19	17	21	12	13	17
South Atlantic States:								
Delaware	0	1	2	1	0	0	0	6
Maryland [2]	0	2	17	7	0	0	28	34
District of Columbia	1	0	4	2	0	0	2	6
Virginia		2						
West Virginia	1	0	8	13	1	4	36	35
North Carolina	1	3	22	35	1	0	47	70
South Carolina	3	2	1	2	0	3	94	83
Georgia [3]	1	0	6	14	7	0	60	71
Florida [3]	1	0	6	1	0	0	6	3

Footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 1, 1931, and August 2, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930	Week ended Aug. 1, 1931	Week ended Aug 2, 1930	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930	Week ended Aug. 1, 1931	Week ended Aug. 2, 1930
East South Central States:								
Kentucky	0	0	21	22	0	0	13	34
Tennessee	1	2	6	6	3	2	89	47
Alabama [3]	0	2	12	4	1	0	58	42
Mississippi	1	3	4	4	7	1	55	38
West South Central States:								
Arkansas	0	8	13	2	4	2	46	35
Louisiana	1	28	1	10	0	0	76	38
Oklahoma [4]	1	12	11	13	6	10	34	49
Texas [3]	2	6	15	22	1	14	15	26
Mountain States:								
Montana	1	0	2	7	0	3	3	3
Idaho	0	1	3	0	3	1	1	4
Wyoming	0	0	2	3	2	0	1	0
Colorado	1	0	9	6	7	1	4	8
New Mexico	1	0	0	2	1	1	0	4
Arizona	0	0	0	1	0	0	5	7
Utah [2]	0	0	1	2	0	0	0	1
Pacific States:								
Washington	0	1	5	13	5	16	4	5
Oregon	0	2	2	2	8	6	6	8
California	3	71	42	26	7	18	16	30

[2] Week ended Friday.
[3] Typhus fever: 1931, 12 cases; 3 cases in Georgia; 5 cases in Florida; 1 case in Alabama; and 3 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May, 1931										
Hawaii Territory	1	27	19		135		2	7	0	3
June, 1931										
California	10	244	103	7	2,671	7	26	362	76	59
Idaho	8	11	3		15		0	39	30	9
Mississippi	5	22	188	3,485	134	2,184	7	29	143	101
Montana	1	3	7		58		2	26	14	19
Nevada					33		0	5	0	0
South Carolina		110	760	1,521	550	966	9	6	18	119
South Dakota		19	3		36		1	34	38	7
Texas	4	61	74	828		10	1	98		59
Virginia	7	61	363	56	1,159	105	1	83	9	82
Washington		31	103		388		1	81	90	21
July, 1931										
Georgia	3	15	19	179	68	73	2	42		252

May, 1931

	Cases
Hawaii Territory:	
Chicken pox	32
Conjunctivitis, follicular	52
Dysentery (bacillary)	4
Erysipelas	2
Hookworm disease	33
Hawaii Territory—Continued.	
Impetigo contagiosa	1
Leprosy	4
Lethargic encephalitis	2
Mumps	30
Tetanus	4

Hawaii Territory—Continued.	Cases
Trachoma	4
Whooping cough	1

June, 1931

	Cases
Actinomycosis:	
California	1
Chicken pox:	
California	936
Idaho	6
Mississippi	319
Montana	65
Nevada	7
South Carolina	177
South Dakota	48
Virginia	336
Washington	366
Dengue:	
Mississippi	25
South Carolina	1
Diarrhea:	
South Carolina	3,181
Virginia	1,056
Dysentery:	
California (amebic)	5
California (bacillary)	14
Mississippi (amebic)	75
South Carolina	20
Washington	1
Food poisoning:	
California	27
German measles:	
California	30
Montana	7
South Carolina	33
Washington	22
Granuloma, coccidioidal:	
California	1
Hookworm disease:	
Mississippi	254
South Carolina	117
Impetigo contagiosa:	
Montana	3
Washington	5
Leprosy:	
California	1
Lethargic encephalitis:	
California	4
South Carolina	4
Texas	1
Washington	4
Mumps:	
California	612
Idaho	8
Mississippi	162
Montana	13
South Carolina	73
South Dakota	11
Washington	138
Ophthalmia neonatorum:	
California	3
Mississippi	4
South Carolina	24
Paratyphoid fever:	
California	5
Idaho	1
South Carolina	7
Texas	2
Washington	2
Puerperal septicemia:	
Mississippi	18
Washington	2
Rabies in animals:	
California	75
Mississippi	9
South Carolina	22
Rocky Mountain spotted or tick fever:	
California	1
Idaho	2
Montana	3
Nevada	2
South Dakota	1
Septic sore throat:	
California	7
Idaho	2
Tetanus:	
California	8
Trachoma:	
California	9
Mississippi	2
Montana	3
South Dakota	5
Tularaemia:	
Idaho	2
Nevada	1
Virginia	1
Typhus fever:	
Virginia	3
Undulant fever:	
California	8
Idaho	12
Virginia	1
Washington	2
Vincent's angina:	
Washington	1
Whooping cough:	
California	817
Idaho	22
Mississippi	444
Montana	58
Nevada	2
South Carolina	250
South Dakota	38
Virginia	546
Washington	405

July, 1931

	Cases
Georgia:	
Chicken pox	21
Dengue	1
Dysentery	76
Mumps	39
Septic sore throat	23
Typhus fever	15
Undulant fever	1
Whooping cough	49

PLAGUE-INFECTED GROUND SQUIRRELS IN CALIFORNIA

The Director of Public Health of California reported, under date of July 31, 1931, that plague had been proved by animal inoculation in four ground squirrels from ranches in San Benito County, Calif., about 22 miles south of Hollister.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,480,000. The estimated population of the 91 cities reporting deaths is more than 31,935,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended July 25, 1931, and July 26, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	487	587	
98 cities	215	234	513
Measles:			
45 States	2,411	1,966	
98 cities	854	661	
Meningococcus meningitis:			
46 States	59	64	
98 cities	29	31	
Poliomyelitis:			
46 States	307	222	
Scarlet fever:			
46 States	951	782	
98 cities	338	306	332
Smallpox:			
46 States	204	386	
98 cities	19	42	26
Typhoid fever:			
46 States	758	832	
98 cities	101	114	99
Deaths reported			
Influenza and pneumonia:			
91 cities	279	352	
Smallpox:			
91 cities	0	0	

City reports for week ended July 25, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	1	2	0	----------	0	1	0	0
New Hampshire:								
Concord	0	0	0	----------	0	0	0	0
Nashua	0	0	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Massachusetts:								
Boston	20	19	18	1	0	17	3	4
Fall River	0	1	0	----------	0	6	0	0
Springfield	3	1	0	----------	0	3	2	1
Worcester	3	1	0	----------	0	3	5	1
Rhode Island:								
Pawtucket	0	1	0	----------	0	0	0	0
Providence	1	3	2	----------	0	50	4	4
Connecticut:								
Bridgeport	6	2	1	----------	0	7	4	1
Hartford	0	1	0	----------	0	0	4	1
New Haven	0	0	0	----------	0	0	0	1
MIDDLE ATLANTIC								
New York:								
Buffalo	6	7	1	----------	0	17	6	7
New York	32	131	63	3	1	131	26	85
Rochester	0	3	3	----------	0	32	5	1
Syracuse	6	1	0	----------	0	11	2	1
New Jersey:								
Camden	0	3	0	----------	0	0	1	0
Newark	12	8	1	----------	0	12	4	5
Trenton	0	1	0	----------	0	5	4	0
Pennsylvania:								
Philadelphia	11	32	8	1	1	28	20	12
Pittsburgh	3	12	1	1	1	10	13	12
Reading	0	1	0	----------	0	2	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	3	1	----------	0	4	2	3
Cleveland	8	16	2	1	0	57	68	7
Columbus	4	2	0	----------	0	0	2	3
Toledo	11	2	1	----------	0	9	5	1
Indiana:								
Fort Wayne	1	1	4	----------	0	2	0	0
Indianapolis	4	2	1	----------	0	8	2	4
South Bend	0	0	0	----------	0	0	0	1
Terre Haute	0	0	0	----------	0	0	0	2
Illinois:								
Chicago	33	58	40	3	1	185	14	18
Springfield	2	0	0	1	0	1	3	0
Michigan:								
Detroit	16	26	15	----------	1	7	8	8
Flint	2	1	0	----------	0	0	0	0
Grand Rapids	1	0	0	----------	0	5	0	1

City reports for week ended July 25, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	0	0	0		0	3	25	0
Madison	1	0	0			0	11	
Milwaukee	42	8	2	1	1	79	96	4
Racine	2	0	0		0	1	11	0
Superior	2	0	0		0	1	2	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	4	0	0		0	2	0	0
Minneapolis	5	8	3		0	7	3	3
St. Paul	[illegible]	4	0		0	2	0	4
Iowa:								
Davenport	0	1	0			0	0	
Des Moines	0	1	0			1	2	
Sioux City	1	0	2			1	2	
Waterloo	0	0	2			0	0	
Missouri:								
Kansas City	0	1	2		0	3	2	4
St. Joseph	0	0	0		0	2	0	0
St. Louis	1	15	6			0	3	1
North Dakota:								
Fargo	1	0	0		0	0	0	1
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	2	0	0			0	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	0	2	1		0	0	1	3
Kansas:								
Topeka	0	1	0		0	0	11	0
Wichita	2	0	1		0	1	0	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	1	1	1
Maryland:								
Baltimore	15	9	5		0	12	5	10
Cumberland	0	0	0		0	0	0	0
Frederick	0	0	1		0	1	0	0
District of Columbia:								
Washington	4	5	4		0	0	0	3
Virginia:								
Lynchburg	0	0	1		0	0	0	0
Norfolk	0	0	0		0	0	3	2
Richmond	0	1	1		0	1	0	0
Roanoke	0	0	0		0	0	0	0
West Virginia:								
Charleston	0	0	0		0	0	0	0
Wheeling	0	0	0		0	12	0	0
North Carolina:								
Raleigh	0	0	0		0	3	0	0
Wilmington	0	0	0		0	0	0	0
Winston-Salem	0	0	1		0	9	4	0
South Carolina:								
Charleston	0	0	0	6	0	0	0	1
Columbia	0	0	0		0	0	0	0
Greenville	0	0	0		0	0	0	0
Georgia:								
Atlanta	0	2	1	1	1	3	0	5
Brunswick	0	0	0		0	0	0	0
Savannah	0	1	0		0	0	0	1
Florida:								
Miami	0	1	1		0	4	0	0
Tampa	0	1			0	0	0	1

City reports for week ended July 25, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	0	0	1
Tennessee:								
Memphis	0	1	0		0	14	0	4
Nashville	0	1	0		0	1	0	0
Alabama:								
Birmingham	0	1	0		0	3	0	1
Mobile	0	0	2		0	0	0	1
Montgomery	0	0	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			0	0	
Little Rock	0	0	0		0	0	0	
Louisiana:								
New Orleans	0	5	5	2	0	0	0	9
Shreveport	0	0	0		0	0	0	1
Oklahoma:								
Muskogee	0	0	0		0	0	0	0
Oklahoma City	0	0	1		0	0	0	6
Texas:								
Dallas	2	2	0		0	1	1	0
Fort Worth	0	1	0		0	0	0	2
Galveston	0	0	0		0	0	0	0
Houston	0	2	1		0	2	0	4
San Antonio	0	1	1		1	1	0	1
MOUNTAIN								
Montana:								
Billings	0	0	0		0	10	0	0
Great Falls	7	0	0		0	3	0	0
Helena	0	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	1	0	0		0	1	0	0
Colorado:								
Denver	12	7	4		0	3	5	2
Pueblo	4	0	0		0	0	0	0
New Mexico:								
Albuquerque	1	0	0		0	0	0	0
Arizona:								
Phoenix	2	0	0		0	0	0	3
Utah:								
Salt Lake City	8	1	0		0	3	1	0
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	4	1	0			3	4	
Spokane	1	0	0			3	0	
Tacoma	1	2	0		0	1	4	2
Oregon:								
Portland	3	3	1		1	0	1	3
Salem	0	0	1		0	0	2	0
California:								
Los Angeles	5	22	7	5	1	20	2	7
Sacramento	1	2	1		0	20	6	4
San Francisco	1	7	0	3	0	17	1	5

City reports for week ended July 25, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
NEW ENGLAND											
Maine:											
Portland	0	1	0	0	0	2	0	0	0	2	22
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	4
Nashua	0	0	0	0	0	0	0	0	0	0	
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	3	2
Massachusetts:											
Boston	21	21	0	0	0	10	2	4	1	28	175
Fall River	1	6	0	0	0	0	0	0	0	3	12
Springfield	1	2	0	0	0	2	0	0	0	7	27
Worcester	2	7	0	0	0	2	0	0	0	9	
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	22
Providence	3	6	0	0	0	4	0	0	0	4	54
Connecticut:											
Bridgeport	2	0	0	0	0	2	0	0	1	3	26
Hartford	1	1	0	0	0	0	0	0	0	13	40
New Haven	1	2	0	0	0	2	0	0	0	3	44
MIDDLE ATLANTIC											
New York:											
Buffalo	8	8	0	0	0	8	0	0	0	27	119
New York	41	44	0	0	0	90	16	12	3	221	1,265
Rochester	2	13	0	0	0	0	0	0	0	10	46
Syracuse	2	1	0	0	0	1	0	3	0	10	43
New Jersey:											
Camden	1	1	0	0	0	0	0	0	0	3	17
Newark	6	13	0	0	0	5	0	0	0	148	80
Trenton	0	3	0	0	0	3	0	0	0	3	32
Pennsylvania:											
Philadelphia	24	30	0	0	0	21	5	2	1	96	401
Pittsburgh	10	11	0	0	0	8	1	1	1	41	144
Reading	0	1	0	0	0	0	0	0	0	1	21
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	5	8	1	0	0	16	1	2	0	5	125
Cleveland	13	13	0	0	0	9	2	3	1	72	176
Columbus	2	0	1	0	0	4	1	2	1	1	72
Toledo	3	1	1	0	0	2	1	0	0	33	56
Indiana:											
Fort Wayne	1	0	0	0	0	2	0	0	0	2	23
Indianapolis	2	4	3	0	0	5	0	0	0	44	
South Bend	0	0	0	0	0	1	0	0	0	1	21
Terre Haute	1	0	0	0		0	0	0	0	0	19
Illinois:											
Chicago	41	49	1	0	0	50	4	0	0	127	623
Springfield	0	2	0	0	0	1	0	0	0	2	22
Michigan:											
Detroit	30	24	1	8	0	21	3	1	0	237	208
Flint	5	2	1	0	0	1	0	0	0	4	18
Grand Rapids	4	1	1	0	0	2	0	0	0	10	26
Wisconsin:											
Kenosha	0	1	0	0	0	0	0	0	0	4	12
Madison	1	1	0	0			0	0		4	
Milwaukee	7	5	1	0	0	7	0	1	0	86	95
Racine	2	4	0	0	0	0	0	0	0	18	24
Superior	1	0	0	0	0	1	0	0	0	0	4
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	0	0	0	0	0	0	0	0	0	18
Minneapolis	11	0	0	0	0	2	0	0	0	3	107
St. Paul	7	5	0	0	0	0	0	0	0	17	49

City reports for week ended July 25, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
WEST NORTH CENTRAL—continued											
Iowa:											
Davenport	0	2	2	3			0	0		2	
Des Moines	2	0	0	4			0	0		0	32
Sioux City	0	0	1	0			0	0		2	
Waterloo	1	0	0	0			0	0		6	
Missouri:											
Kansas City	2	3	0	0	0	4	1	5	0	4	90
St. Joseph	0	0	0	0	0	0	0	0	0	0	11
St. Louis	8	4	1	1	0	8	4	3	1	75	202
North Dakota:											
Fargo	0	1	0	0	0	0	0	0	0	3	12
Grand Forks	0	0	0	0			0	0		0	
South Dakota:											
Aberdeen	0	0	0	0			0	0		0	
Sioux Falls	0	0	0	0			0	1		0	10
Nebraska:											
Omaha	1	1	1	4	0	0	0	0	0	1	49
Kansas:											
Topeka	1	0	1	0	0	0	0	1	0	4	6
Wichita	1	1	0	0	0	0	0	1	0	3	25
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	4	0	0	0	3	0	0	0	5	25
Maryland:											
Baltimore	7	6	0	0	0	11	5	6	1	105	187
Cumberland	0	0	0	0	0	0	0	0	0	0	4
Frederick	0	0	0	0	0	0	0	0	0	2	
District of Columbia:											
Washington	5	2	0	0	0	10	2	4	1	17	118
Virginia:											
Lynchburg	0	0	0	0	0	0	1	2	0	0	7
Norfolk	0	1	0	0	0	0	1	3	0	1	
Richmond	1	3	0	0	0	3	1	3	0	0	54
Roanoke	1	1	0	0	0	3	1	0	1	2	15
West Virginia:											
Charleston	0	0	0	0	0	0	1	0	0	9	5
Wheeling	0	0	0	0	0	0	0	0	0	0	9
North Carolina:											
Raleigh	0	0	1	0	0	2	1	0	0	5	14
Wilmington	0	0	0	0	0	0	0	0	0	5	8
Winston-Salem	0	0	0	0	0	1	1	1	0	11	17
South Carolina:											
Charleston	0	0	0	0	0	0	1	13	0	0	21
Columbia	0	0	0	0	0	2	2	2	0	0	30
Greenville	0	0	1	0	0	0	2	2	0	5	
Georgia:											
Atlanta	2	3	0	0	0	1	2		1	3	85
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	0	0	0	0	4	1	3	1	1	34
Florida:											
Miami	1	0	0	0	0	4	0	0	0	0	23
Tampa	0	0	0	0	0	1	0	1	0	1	19
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0		0	0	0	0	0	25
Tennessee:											
Memphis	1	0	1	1	0	5	8	5	1	42	89
Nashville	1	0	0	0	0	4	5	2	0	4	46
Alabama:											
Birmingham	1	0	0	0	0	3	4	0	1	2	49
Mobile	0	0	0	0	0	0	1	1	1	0	20
Montgomery	0	1	0	0			2	0		0	

City reports for week ended July 25, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	2	0	0	--------	--------	0	0	--------	1	--------
Little Rock	0	0	0	0	0	2	1	0	0	0	--------
Louisiana:											
New Orleans	3	5	0	0	0	17	4	3	2	0	138
Shreveport	0	0	0	0	0	2	3	0	1	7	34
Oklahoma:											
Muskogee	1	0	0	0	0	0	0	5	0	0	--------
Oklahoma City	0	3	0	1	0	3	3	7	0	0	36
Texas:											
Dallas	2	4	0	0	0	6	3	0	1	4	63
Fort Worth	1	4	0	0	0	5	1	0	0	0	32
Galveston	0	0	0	0	0	0	0	0	0	0	12
Houston	1	1	0	0	0	6	1	0	0	0	60
San Antonio	1	1	0	0	0	10	1	0	0	1	46
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	2	4
Great Falls	1	0	1	0	0	0	0	0	0	7	9
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	0	0	1	0	0	0	0	0	0	0	12
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	1	6
Colorado:											
Denver	4	0	0	0	0	7	0	0	0	19	88
Pueblo	0	0	1	0	0	0	2	0	0	3	11
New Mexico:											
Albuquerque	0	0	0	0	0	1	0	0	0	2	10
Arizona:											
Phoenix	0	0	0	0	0	1	0	0	0	0	--------
Utah:											
Salt Lake City	1	0	1	0	0	3	1	0	0	12	3
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	1
PACIFIC											
Washington:											
Seattle	2	4	1	0	--------	--------	0	4	--------	50	--------
Spokane	0	1	1	6	--------	--------	0	0	--------	5	--------
Tacoma	1	0	2	3	0	0	0	0	0	2	21
Oregon:											
Portland	2	4	5	1	0	1	0	0	0	3	84
Salem	0	0	1	0	0	0	0	0	0	0	--------
California:											
Los Angeles	12	1	2	1	0	28	2	2	1	43	238
Sacramento	1	0	0	0	0	1	1	7	0	7	--------
San Francisco	6	0	0	0	0	5	1	1	0	1	137

City reports for week ended July 25, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	0	0	0	0	0	1	8	0
Fall River	0	0	0	0	0	0	0	1	0
Springfield	0	0	0	0	0	0	0	1	0
Worcester	0	1	0	0	0	0	0	0	0
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	0	1
Hartford	0	0	0	0	0	0	0	3	0
New Haven	0	0	0	0	0	0	0	4	1
MIDDLE ATLANTIC									
New York:									
New York	6	2	0	0	0	1	4	195	19
New Jersey:									
Newark	0	0	0	0	0	0	1	2	0
Pennsylvania:									
Philadelphia	3	1	0	0	0	0	1	0	0
Pittsburgh	1	0	1	1	0	0	0	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Cleveland	0	1	0	0	0	0	0	0	0
Columbus	0	0	0	0	1	1	0	0	0
Toledo	1	0	0	0	0	0	0	0	0
Indiana:									
Fort Wayne	0	1	0	0	0	0	0	0	0
Indianapolis	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago	7	4	0	0	0	0	1	2	1
Michigan:									
Detroit	1	0	1	0	0	0	0	4	0
Grand Rapids	0	0	1	0	0	0	0	1	0
Wisconsin:									
Milwaukee	0	0	0	0	0	0	0	3	0
Superior	1	0	0	1	0	0	0	0	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	1	1
St. Paul	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	0	0	0	0	1	1	0	0	0
St. Louis	1	0	0	0	0	0	0	0	0
North Dakota:									
Fargo	1	0	0	0	0	0	0	0	0
Nebraska:									
Omaha	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	2	0	0	0	0	0	0	0
Virginia:									
Roanoke	0	0	0	0	0	0	0	1	0
West Virginia:									
Wheeling	0	0	0	0	0	0	0	1	0
North Carolina:									
Raleigh	0	0	0	0	1	1	0	0	0
Wilmington	0	0	0	0	1	0	0	0	0
Winston-Salem	0	0	0	0	1	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	12	0	0	0	0
Columbia	0	2	0	0	0	4	0	0	0
Georgia:[1]									
Savannah [1]	0	0	0	0	2	1	0	0	0
Florida:[1]									
Miami	0	0	0	0	0	1	0	0	0

[1] Typhus fever: 3 cases, 2 deaths; 1 case at Atlanta, Ga.; 1 case and 1 death at Savannah, Ga.; 1 case and 1 death at Tampa, Fla.

City reports for week ended July 25, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	1	1	0	0	0	1	1	0	0
Mobile	0	0	0	0	0	1	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	0	0	0	1	1	0	1	0
Shreveport	0	0	0	0	0	1	1	0	0
Texas:									
Dallas	0	0	0	0	0	1	0	0	0
Fort Worth	0	0	0	0	0	1	0	0	0
Houston	0	0	0	0	0	1	0	0	0
San Antonio	1	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	0	0	0	0	0	0	0	1	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended July 25, 1931, compared with those for a like period ended July 26, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, June 21 to July 25, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930
98 cities	54	65	[2] 47	57	43	58	[3] 42	48	33	37
New England	67	68	96	56	60	41	65	36	50	24
Middle Atlantic	47	62	53	56	50	49	[4] 37	46	34	33
East North Central	72	97	[6] 51	91	41	86	[5] 50	66	39	49
West North Central	42	72	33	37	31	68	31	39	33	35
South Atlantic	45	26	[7] 12	26	18	32	24	46	28	38
East South Central	23	12	12	36	23	24	29	12	12	24
West South Central	68	35	27	49	61	59	47	35	24	31
Mountain	9	0	[8] 9	9	17	26	61	70	35	70
Pacific	51	54	51	32	41	53	51	32	16	28

Footnotes at end of table.

Summary of weekly reports from cities, June 21 to July 25, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

MEASLES CASE RATES

	Week ended—									
	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930
98 cities	568	489	[2] 347	270	316	232	[3] 183	147	133	105
New England	438	832	402	544	351	460	317	256	209	191
Middle Atlantic	511	607	283	322	311	305	[4] 148	195	111	144
East North Central	921	331	[5] 643	168	527	154	[6] 319	70	214	59
West North Central	296	269	143	139	103	130	61	50	34	64
South Atlantic	591	256	[7] 310	180	259	142	107	122	83	50
East South Central	588	227	349	126	116	179	116	42	105	54
West South Central	47	17	24	24	27	17	17	10	14	7
Mountain	479	1,454	[8] 215	731	122	582	122	247	174	176
Pacific	362	798	149	451	182	482	123	310	125	164

SCARLET FEVER CASE RATES

	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930
98 cities	168	107	[2] 104	75	79	71	[3] 69	53	53	49
New England	238	135	188	73	142	73	149	65	111	73
Middle Atlantic	194	85	135	54	89	49	[4] 65	35	56	34
East North Central	240	182	[5] 121	115	90	114	[6] 105	86	69	76
West North Central	78	99	31	105	44	85	42	43	29	31
South Atlantic	93	68	[7] 54	62	49	68	34	48	38	40
East South Central	64	54	47	12	52	42	23	18	6	48
West South Central	30	38	41	45	34	35	34	21	44	45
Mountain	96	62	[8] 36	167	52	88	26	79	0	26
Pacific	57	49	47	38	49	43	12	49	12	38

SMALLPOX CASE RATES

	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930
98 cities	8	13	[2] 6	6	2	7	[3] 3	6	3	7
New England	0	0	0	0	2	0	0	0	0	0
Middle Atlantic	1	0	0	0	0	0	[4] 0	0	0	0
East North Central	5	10	[5] 8	5	1	9	[6] 4	10	2	8
West North Central	19	52	10	14	4	10	4	14	10	21
South Atlantic	12	10	[7] 0	2	4	0	0	4	0	2
East South Central	17	6	23	18	6	18	0	0	6	18
West South Central	30	21	24	0	10	7	7	7	0	3
Mountain	70	53	[8] 0	53	0	9	0	18	0	18
Pacific	6	43	14	32	8	36	22	18	20	22

TYHOID FEVER CASE RATES

	June 27, 1931	June 28, 1930	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930
98 cities	10	13	[2] 10	10	14	16	[3] 13	16	16	18
New England	0	10	10	7	2	5	12	10	10	7
Middle Atlantic	4	5	5	5	8	10	[4] 7	4	8	7
East North Central	6	10	[5] 3	1	5	6	[6] 6	9	5	13
West North Central	10	14	10	8	19	10	2	23	19	48
South Atlantic	16	40	[7] 10	28	28	60	47	44	69	42
East South Central	35	60	41	84	58	84	35	60	47	66
West South Central	54	31	71	45	81	35	57	59	10	38
Mountain	52	35	[8] 36	0	35	0	26	26	0	18
Pacific	14	4	4	4	6	14	6	16	27	10

See footnotes at end of table.

Summary of weekly reports from cities, June 21 to July 25, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

INFLUENZA DEATH RATES

	Week ended—									
	June 27, 1931	June 28, 1930	July 4, 1931	July 4, 1930	July (1, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930
91 cities	4	3	[2] 3	4	3	3	[3] 2	2	1	2
New England	2	0	0	2	2	0	0	0	0	0
Middle Atlantic	2	2	1	4	4	4	[4] 0	3	1	1
East North Central	6	2	[5] 1	2	2	3	[6] 4	2	2	3
West North Central	0	0	9	0	0	6	3	0	0	3
South Atlantic	6	6	[7] 4	6	4	2	4	0	2	4
East South Central	6	13	19	6	6	13	0	0	0	0
West South Central	7	11	10	14	7	7	3	11	3	11
Mountain	0	0	[8] 9	0	0	0	0	9	0	0
Pacific	2	2	5	7	0	2	0	5	2	2

PNEUMONIA DEATH RATES

	June 27, 1931	June 28, 1930	July 4, 1931	July 4, 1930	July (1, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930
91 cities	67	66	[2] 64	54	59	53	[3] 47	43	44	56
New England	60	53	36	36	79	44	50	39	31	44
Middle Atlantic	76	71	67	55	59	54	[4] 63	54	55	68
East North Central	51	56	[5] 61	40	47	37	[6] 29	32	32	38
West North Central	38	87	77	63	88	75	71	39	53	57
South Atlantic	103	72	[7] 67	60	71	60	39	54	43	86
East South Central	139	91	82	142	50	71	44	52	44	91
West South Central	90	85	90	78	86	78	45	46	52	71
Mountain	35	79	[8] 72	62	61	106	35	53	17	79
Pacific	41	45	46	52	31	50	24	15	43	7

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Milwaukee, Wis., Columbia, S. C., and Billings, Mont., not included.
[3] Newark, N. J., and Racine, Wis., not included.
[4] Newark, N. J., not included.
[5] Milwaukee, Wis., not included.
[6] Racine, Wis., not included.
[7] Columbia, S. C., not included.
[8] Billings, Mont., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended July 18, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended July 18, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		2			
New Brunswick					1
Quebec			1		15
Ontario	1	2	1	12	12
Manitoba					1
Saskatchewan				10	
Alberta					1
British Columbia		2	1	2	3
Total	1	6	3	24	33

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended July 25, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended July 25, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Ophthalmia neonatorum	3
Chicken pox	16	Poliomyelitis	2
Diphtheria	18	Scarlet fever	31
Erysipelas	2	Tuberculosis	26
German measles	3	Typhoid fever	22
Measles	44	Whooping cough	11
Mumps	1		

FRENCH WEST AFRICA

Yellow Fever—Upper Volta—Ivory Coast.—On July 24, 1931, 2 cases of yellow fever were reported at Banfora, Upper Volta.

On July 29, 1931, 2 cases of yellow fever were reported at Grand Bassam, Ivory Coast.

GOLD COAST

Yellow Fever—Wale Wale.—A fatal case of yellow fever was reported July 30, 1931, at Wale Wale, Gold Coast.

HAWAII TERRITORY

Plague—Kula District—Maui Island.—A fatal case of plague was reported August 2, 1931, in the rural district of Kula, on the island of Maui. The last previous case of plague on the island was reported in 1900.

IRAK

Cholera—Basra.—Three cases of cholera with two deaths were reported at Basra, Irak, July 27, 1931. The disease was said to have been brought by a vessel which came from Bushire, Persia.

PANAMA CANAL ZONE

Communicable diseases—June, 1931.—During the month of June, 1931, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	13		Meningococcus meningitis	2	
Diphtheria	5	1	Mumps	1	
Dysentery (amebic)	6		Pneumonia		36
Leprosy	1	1	Tuberculosis		38
Malaria	458	5	Typhoid fever	1	
Measles	38		Whooping cough	9	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931				June, 1931				July, 1931				Aug. 1, 1931
						9	16	23	30	6	13	20	27	4	11	18	25	
Ceylon: Colombo	C			1					1	1								
	D								1	1								
China:																		
Canton	C				1			2				1						
	D							1										
Shanghai	C														P			
Swatow	C										3	1	6					
Tientsin	C								1									
	D								1									
India	C	15,334	11,544	8,968	11,462	3,242	3,013	3,565	3,784									
	D	8,123	6,131	4,550	5,767	1,806	1,598	1,845	2,021									
Bombay	C	21			2										1	11		
	D	9			1											6		
Calcutta	C	121	170	436	310	72	89	49	55	94	74	50	74	72				
	D	86	112	256	176	39	44	34	32	57	47	26	38	35				
Karikal	C		9	12	19	10		1	1									
	D		8	12	14	5		1	1									
Madras	C	90	72	20	26	18	23	11		3	6				2			
	D	47	29	10	13	6	8	2	1		4							
Negapatam	D	3	3															
Rangoon	C								2		2		2					
	D	1							1		1		1					
Tuticorin	C	1	1															
Vizagapatam	C												1					
India (French):																		
Chandernagor	C	1	5	7	6	3		1			1	2						
	D	1	5	6	5	3		1			1	2						
Pondicherry	C	19	100	100	24	3	8	2	4	1	1	1						
	D	11	34	18	4		3		4	1	1	1						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931				June, 1931				July, 1931				Aug. 1, 1931
						9	16	23	30	6	13	20	27	4	11	18	25	1
Indo-China (see also table below):																		
Cochin-China—Rachgia	C																	P
Pnompenh	C	4	9		2					1					1			
	D	2	5	1	1	2				1					1			
Saigon and Cholon	C	6	4	5	27	25	23	34	22	18	16	14	13	8	3			
	D	3	4	5	22	20	18	25	13	9	14	9	9	3	2			
Irak: Basra	C																	3
	D																	2
Persia: Rafsanjan [1]	C					31	1	4										
	D					12		2										
Philippine Islands: [2]																		
Iloilo	C	2																
	D	2																
Provinces—																		
Capiz	C	59	186	48	29	11	3		3	4								
	D	47	146	41	24	11	3		1	4								
Iloilo	C	145	95	7						8	7	5	6	24	3			
	D	110	65	4						6	5	6	4	22	3			
Masbate	C			21														
	D			9														
Negros, Occidental	C	90	4										2					
	D	56	4										1					
Negros, Oriental	C	1																
	D	1																
Pampanga	C					1												
Siam	C	3	1	10	16	11	2	1			1	3			1			
	D	1		2	4	3	1	1			1	1			1			
Ayudhaya District	C			1														
Bangkok	C	3	2	3	3	1	1	1					1	1				
	D	1	1	2	2			1					1					
Bismulok Province	C			8														
	D			2														

On vessel:																		
S. S. Arankola, at Rangoon from Calcutta	C								1									
S. S. City of Eastborne, at Calcutta from Cocanada	C									1								
S. S. Tairea, at Penang from Calcutta	C										1							

Place		December, 1930	January, 1931	February, 1931	March, 1931			April, 1931			May, 1931			June, 1931	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):															
Cambodia [2]	C	28	62	125	14		65	36	22			44	40	83	96
Cochin-China [3]	C	8	24	29	39	33	33	22	40		1	52	75	71	69

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931 9	May 16	May 23	May 30	June, 1931 6	June 13	June 20	June 27	July, 1931 4	July 11	July 18	July 25	Aug. 1, 1931
Algeria:																		
Algiers	C	2	1	1													2	
	D			1														
Bone	C	1									1							
Constantine, vicinity of	C	1	1															
	D	1																
Argentina:																		
Cordoba Province	C	1	2															
Entre Rios Province—Diamante	C		2															
Jujuy Province—Palpala	C	1	1															
San Juan Province	C														P	P		
Santa Fe	C		2															
Belgian Congo	C			2							1							
	D			2							1							
British East Africa (see also table below):																		
Tanganyika	C		22	8	18	17	5	7	17	4	7							
	D		4	1	21	11	2	8	9	2	4							
Uganda	C	25	15	19	35	11	33	31	63									
	D	24	15	19	32	11	26	28	61									
Ceylon: Colombo	C	8	11	8	4	1	1		1		1							
	D	6	13	7	3	1	1		1		1							
Plague infected rats		2	3	4	1			5										
China: Amoy [1]	C					1												
	D					1												
Dutch East Indies:																		
Batavia and West Java	C	180	141	84	74	18	12	14	15	15								
	D	168	128	80	71	18	12	14	15	15								
East Java and Madura	C	4	1	4	1	1												
	D	4	1	4	1	1												
Java and Madura	D	427	376	277	243	47	41	46	42	41	58	48	45					
Egypt:																		
Alexandria	C	1	2	1								3	1	1	1	2		
	D											3	1	1				
Plague-infected rats		1	1															
Assiout	C	26	41	13	32	4	5	8	1	4		5	2					
	D	6	11	6	17	2	4	1					1					

Beni-Suef	C	1			12	3		2										
	D	1			3	1		2										
Cairo	C			1														
Deirout	C	21	16		3	7	1		2	3								
	D	4	4		1	2	2			1								
Gharbieh	C	1									1							
	D	1									1							
Girga	C	1		86	44	1	1		5					1				
	D	1		24	22	1	1											
Kena	C			5	3			1										
	D			2	1			1										
Manfalut	C	30	15	17														
	D	6	5	3														
Minieh	C	2		3	1	5		1		3				10		2		
	D	1		2		2		1		1				2		1		
Port Said	C										1	1	1	1	1	2	1	
	D							1				1	1	1				
Hawaii Territory:																		
Hawaii—Hamakua—Plague-infected rats								1										
Maui	C																	1
	D																	1
India	C	5,335	5,457	9,139	6,142	434	139	130	49									
	D	3,422	3,661	7,037	5,109	385	143	131	33									
Bassein	C	4	1		1			1						1				
	D	3	1		1			1						1				
Bombay	C	1	1	4	11	5		1	1					1				
	D	1	1	3	11	4	1	1										
Plague-infected rats		34	32	70	137	26	30	17	21	10	10	10	7	11	16			
Calcutta	C				2													
	D				2													
Madras Presidency	C	312	74	23	3	1	1				1							
	D	182	46	21	2		1				1							
Rangoon	C	2		1	1	1			1		1					2		
	D	1		1	1	1			1		1					1		
Plague-infected rats		4	8	7	4	1	1	3	2		3			1	2			
Indo-China (see also table below): Pnompenh	C	7	1							1		1						
	D	7	4	6	4					1		1						
Iraq:																		
Baghdad	C	5	3	8	23	7	10	4	2	10	6	1	6	1	1			
	D	4	2	5	8	3	4	2		1	4	1	3	1				
Maudhan	C								2									
Madagascar (see also table below): Tamatave	C	9																
Morocco	C	13																
	D	4																
Nigeria: Lagos	C	1			5													
	D	1			5													
Plague-infected rats					6													
Peru (see table below).																		
Senegal (see table below).																		

[1] On July 23, 1931, an indirect report was received stating that an epidemic of plague had occurred in Chiobe and Changchow, China, not far from Amoy.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	Aug. 1, 1931
Siam	C	4	18	31	1	1			1	1								
	D	2	14	7	1	1			1	1								
Bangkok	C	8	6	29														
	D	8	5	6														
Nagara Rajsima	C	9	7	1														
	D	10	6															
Syria: Beirut	C	1	1												1			
Tripolitania	C	8	1															
	D	3																
Tunisia: Tunis	C	1	14	10	16	7		8	1		8	2	1					
	D		7	4	8	3					1							
Union of Socialist Soviet Republics:																		
Gouranduz	D	28																
Transcaucasia—Karabakh	C	6																
Union of South Africa:																		
Cape Province	C				3													
Orange Free State	C	P	1	6	2			1	1									
	D		1	1	2				2									

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
British East Africa (see also table above):							
Kenya	C	69	21	7	315	215	154
Indo-China (see also table above)	C			4	2		2
Madagascar (see also table above):							
Ambositra Province	C	100	92	70	30		
	D	96	88	66	29		
Antsirabe Province	C	66	84	83	48		
	D	57	79	74	47		
Miarinarivo Province	C	28	31	19	6		
	D	26	29	19	6		
Moramanga Province	C	7	7	1			
	D	5	7	1			
Tananarive Province	C	92	145	90	41		
	D	89	139	81	40		

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
Peru	C	29	12				
	D	8	6				
Senegal:							
Baol [1]	C					4	
	D					3	
Dakar [1]	C				2	63	64
	D				1	49	56
Louga [1]	C			14	1	5	
	D			6		2	
Rufisque [1]	C		2			1	2
Thies [1]	C						12
	D						3
Tivaouane [1]	C				4	19	3
	D					11	2

[1] Reports incomplete.

SMALLPOX

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931 11	18	25	May, 1931 2	9	16	23	30	June, 1931 6	13	20	27	July, 1931 4	11
Algeria:																		
Algiers	C	1	1	2		2					1			7	1			
Bone	C	1																
Constantine	C			1					1								1	
Arabia: Aden	C	1	1															
Belgian Congo	C	50								7	10	30						
Belgium	C		1															
Bolivia.[1]																		
Brazil: Porto Alegre (alastrim)	C	3	7	49	20	19	8	6	2	4	7	6	2	3				
	D		1	1									1					
British East Africa: Tanganyika	C	70	91	8						13								
	D	5	13	3														
British South Africa: Southern Rhodesia	C	13												1				
Canada:																		
Alberta	C	7	1															
British Columbia	C	2	8															
Manitoba	C	1	1						4									
Winnipeg	C		1															
Nova Scotia	C	1		1														
Ontario	C	49	29	9	4		6	7	17	5		3		4	3	14	3	6
Kingston	C	1	1				2	3										
North Bay	C		1															
Ottawa	C	3	1												1			
Sault Ste. Marie	C	30	2		3	1				1								
Toronto	C			2		4			1						1			
Quebec	C	2															1	
Saskatchewan	C	38	63	58	5	16	3	22	7	15	18	8	7	16	18	13		13
Regina	C		1	2			2		2									
Canary Islands: Las Palmas	C			1														
Chile:																		
Antofagasta	C																1	
Chanaral	C											1						
China:																		
Amoy	C			1				2	2	1	1	2	1	2		1		
	D			1				1	1		1	1	1	1		1		
Canton	C		3	7	1	2	1				1	2			1		1	

[1] An epidemic of smallpox was reported on May 13 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	April, 1931: 18	April, 1931: 25	May, 1931: 2	May, 1931: 9	May, 1931: 16	May, 1931: 23	May, 1931: 30	June, 1931: 6	June, 1931: 13	June, 1931: 20	June, 1931: 27	July, 1931: 4	July, 1931: 11
China—Continued.																		
Foochow	C	P	P	P	P			P				P		P				
Hong Kong	C	1	9	2		1	2					1						
	D		3	2			1		1			1						
Manchuria—																		
Harbin	C	1	4	2					1	1		1						
Kwantung—Dairen	C			2			1	1	1			1	1					
Nanking	C	P	P	P	P	P	P	P	P	P	P							
Shanghai—																		
Foreigners only	C	12	16	6	2	1	2	2	1	4	1	1	2	6	2		2	1
Including natives	D	13	14	10	2	7	4	5	1		3	3	1	5	4	3	2	
Swatow	D	7	13	26	2													
Tientsin	C	1							2									
Chosen (see table below).																		
Colombia: Cali	D								1									
Dutch East Indies:																		
Batavia and West Java	C	29	2	1						1	1							
	D	2	1															
East Java and Madura	C											1						
Finland	C					1												
France (see table below).																		
Great Britain:																		
England and Wales	C	958	745	795	177	163	212	192	186	166	111	107	83	94	62	48	56	45
Bradford	C	4	1	2	1		1	4	1	3	1	3			5			
Leeds	C			1		1	1		1		1							
London	C	140	98	147	51	39	84	53	66	44	37	36	25	50	31	16	21	9
London and Great Towns	C	693	683	554	142	126	162	128	139	108	84	72	57	84	49	38	53	33
	D		1		1		1						1					
Sheffield	C	3	32	10	4	2	1											
Stoke-on-Trent	C	1	1															
Greece (see table below).																		

Honduras:																		
Amapala	C		1															
Ocotepeque and Gracias districts	C		P															
Puerto Castilla	C	11	3															
Tegucigalpa	C						1											
Tela	C				1													
India	C	9,6?3	12,2??	11,791	3,9?0	3,749	3,468	3,068	3,422	2,836	2,477	2,668						
	D	2,215	2,660	2,161	807	684	680	752	709	572	538	530						
Bassein	C											1						
Bombay	C	7	6	10	2	2	1	3	3		6	1		2	1			
	D	1	3	1	1			4	1	1	1	1		1	1			
Calcutta	C	14?	251	283	101	60	61	65	24	30	19	16	14	19	14		11	6
	D	100	188	203	78	42	50	54	18	25	17	15	12	18	11		9	4
Cochin	C	29	?0	16	10	11	12	6	3									
	D		3															
Karachi	C	3	4	4		5		1							2			
	D	2		2											1			
Madras	C	16	8	22	12	4	1	2	1	3	3	1			1			2
	D		1	3	2	1	1	1		1	5							
Moulmein	C	2																
Negapatam	C				1	1		1							2	1		
Rangoon	C		4	3	2	2	1	6	7	5		1		1	4	1	2	
	D			1				1	2	1	1	1		1		1	1	
Vizagapatam	C	1	8	2	2	2	4	2			5	1	2	1		3	2	
	D		2	1	1		1				1			1		1	1	
India (French):																		
Chandernagor	C	9	12	14	3	1	4	2	3		4				1			
	D	1	1	2	3	1	2	1	3		2							
Karikal	C	5	19	3		1	1	2	1	1	1	1	1	2				1
	D	4	18			1		2	1	1	1	1	1	2				1
Pondicherry Province	C	45	19	14	3			3	1	2	7	1	3	2	1	1		
	D	45	19	14	3	3		3	1	2	7	1	3	2	1	1		
India (Portuguese)	C	5	11	8		10	2				3							
	D		3	3		4	2				1							
Indo-China (see also table below):																		
Pnompenh	C	1		1							1		2					
	D	1									1							
Saigon and Cholon	C	6	4	8	1					1		1					1	
	D	4	1	8	1					1							1	
Iraq:																		
Baghdad	C		9				1	1			1	2		1				
	D											2						
Basra	C											2		1				
Mosul Liwa	C	3	5															
	D		1															
Ivory Coast (see table below).																		
Japan:																		
Kobe	C		2															
Taiwan	C	1																

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	April 18	April 25	May, 1931: 2	May 9	May 16	May 23	May 30	June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D	1		1				1	1		1			1			1	1
Mexico City and surrounding territory	C		23	83	17	9	11	6	4	10	10	21	5	4	10			
	D	1	8	22	4	6	4		4	3	2	2	4	3	6			
Monterrey	C												1					
Torreon	C					1				1					1	2		
	D					2									1	1		
Vera Cruz	C		3	2		1		1	1									
Morocco (see table below).																		
Nigeria: Lagos	C			2														
Panama Canal Zone	C	2																
Poland	C		1									3	1	1		1		
Portugal: Lisbon	C	103	40	52	8	18	11	19	19	14	16	18	5	17	12	14	15	
Rumania (see table below).																		
Siam	C	4	2				1				3	3						
	D											1						
Spain	C	P	P	P														
Straits Settlements	C	7	2	4	1		9											
	D	1	1	1	1	1	3											
Sudan (Anglo-Egyptian)	C	11	97	8				3		3		1						
	D	7	10	2								1						
Sudan (French) (see table below).																		
Syria (see table below).																		
Tunisia: Tunis	C	8		4														
Turkey (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P		P	P								
Orange Free State	C	P	P	P	P	P	P		P	P	P	P	P	P				
Transvaal	C	P	P	P														
Upper Volta	C		18	3		3			1	2		85	11		1			
	D			1								1						

Place		Dec., 1930	Jan., 1931	Feb. 1-10	Feb. 11-20	Feb. 21-28	Mar. 1-10	Mar. 11-20	Mar. 21-31	Apr. 1-10	Apr. 11-20	Apr. 21-30	May 1-10	May 11-20	May 21-31	June 1-10	June 11-20
On vessel:																	
S. S. Clan Macteggart at Suez	C		2														
S. S. Matheran at Suez from Calcutta	C	1															
S. S. Clan Buchanan at Suez	C		2														
S. S. Rotterdam at Naples from Venice	C			1													
S. S. Clan McTavish at Manila from Chittagong	C					1											
S. S. Benvenue at Sydney from Shanghai	C	1															
S. S. Clan MacBrayne at Cochin	C		1														
S. S. Chilka at Rangoon	C		1														
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C							1									
S. S. Talodi at Suakin	C									1							

Place		December, 1930	January, 1931	February, 1931 1-10	February, 1931 11-20	February, 1931 21-28	March, 1931 1-10	March, 1931 11-20	March, 1931 21-31	April, 1931 1-10	April, 1931 11-20	April, 1931 21-30	May, 1931 1-10	May, 1931 11-20	May, 1931 21-31	June, 1931 1-10	June, 1931 11-20
Indo-China (see also table above)	C	61	141	95	46	27	125		139	100	42			17	41	30	16
Ivory Coast	C	9															
Sudan (French)	C	139					4		P								
	D	20															
Syria: Beirut	C		1														1

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen	C		1		11		1
	D		1		3		
France	C		4	16	15		
Greece	C	4		4			3
Mexico (see also table above)	D	1		3		1	1

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Morocco	C	25		4	6	7	40
Rumania	C				1		1
Turkey	C	116	63	37	1		9
	D	9	7	6			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar 8–Apr. 4, 1931	Week ended— April, 1931 11	April 18	April 25	May, 1931 2	May 9	May 16	May 23	May 30	June, 1931 6	June 13	June 20	June 27	July, 1931 4	July 11	July 18
Algeria:																			
Algiers	C		2	3			2	1	3		1	3	4	4		1			
Constantine Department	C	31	4	3	2		6	1	8	3	5	6	6	3	1	16	2		
Oran	C	3	1				1					2	2						
Australia, Western	C			1					1										
Bulgaria	C	13	5	9		26	4			5	8	3	11	10	6				
	D			2		3				1		3	2	1	1				
Chile: Valparaiso	D		1																
China:																			
Canton	C	2		1															
Manchuria—Harbin	C	3	5	3			8												
Shanghai	C	2																	
Tientsin	C				1	1													
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C					1								1	1		1		
Beheira Province	C				3	1													
	D				2														
Cairo	C	1																	
Port Said	C	1																	
Eritrea: Asmara	C			1															
Great Britain: Scotland	C	1																	
Fife County	C											1							
Glasgow	C	2																	
	D	1																	
Greece (see table below).																			
Guatemala.[1]																			
Iraq: Baghdad	C		5	2					2										
	D		1						2										
Irish Free State:																			
Cork County—																			
Schull	C																	1	
Skibbereen	C													1		1	1		
Kerry County—																			
Dingle	C								1										
Listowel	C															1			

Place																			
Limerick County—																			
Limerick	C																2		
Michelstown	C																1		
Mayo County: Belmullet	C					1													
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico (see also table below).																			
Durango	D	1																	
Mexico City, including municipalities in Federal District	C	29	35	216	67	34	38	31	16	27	17	15	7	12	27				
	D	34	16	84	18	7	17	14	9	7	7	10	4	4	11				
San Luis Potosi	D		5	5	1	2					1	1						1	3
Morocco	C	8	28	7		1		12		13	29			31	42	28	37	20	
	D	2	1					1		2	2			2	3	1	4	4	
Palestine	C	2	3	5	1	2		2	2	1	1			2	3		2		
Panama Canal Zone—Balboa	C									1	1								
Paraguay: Asuncion	D	4	1	1															
Poland	C	106	189	287	93	176	140	129	92	81	58	67		48	33	16	9		
	D	8	19	15	8	7	6	7	6	4	5	3		2	1		2		
Portugal: Oporto	C	1																	
Rumania	C	193	152	214	70				63	52	54		42	16	12				
	D	16	24	16	8				10	5	3		4	7	2				
Syria	C									1	3								
Tunisia:																			
Sbeitla, vicinity of	C			20	2			10											
	D			7															
Sfax	C			2															
Tunis	C	16	18	14	2		1	10	12	9	8			64	9		1		
	D								1	2				4					
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	1	P	P	P		P	P	P	P	P	P					
Municipality of East London	C	3		P															
Natal	C	P	P	1	P	P	P	P	P		P	P	P	P					
Orange Free State	C	P	P	P	P	P	P			P	P	P	P	P					
Transvaal	C	P	P	P	P	P	P		P	P	P	P	P						
Yugoslavia (see table below).																			

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen: Seoul	C	1	1		3	4	
Czechoslovakia	C	21	60	26		5	
Greece	C	10	10	17	8	22	6
	D		2	2	1	3	
Latvia	C			12			

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Lithuania	C	6	26	3	99	34	10
	D	3	3	1	3	5	
Mexico (see also table above)	D	25	66	83			
Turkey	C	2	17	18	15		3
Yugoslavia	C	1	20	12	10	43	14
	D	1	2		1	5	

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reports an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	Aug. 1, 1931
Brazil:																		
Bahia State	C			1														
Ceara State	C	1		2	2		1			1								
	D	1			2		1											
Minas Geraes State	C			2	5	1		1										
	D			1	2	1												
Rio de Janeiro State	C		1	2			1	1										
	D		1	2														
Cambucy	C	3	2	1														
	D	3	1															
Friburgo (imported)	C	1																
Padua	C	2	1															
	D	2																
Sergipe State	C										1							
British Cameroons: Mamfe	C						3			1		1						
	D						2											
Colombia—Magdalena Prov.—near Cienaga	C															4		
Gold Coast:																		
Akuse	C													2				
	D													1				
Kintampo	C															1		
	D															1		
Tamale	C														2			
	D														2			
Wale Wale	C																	1
	D																	1
Ivory Coast:																		
Bobo Dioulasso	C														1			
Grand Bassam	C																	2
Kong Circle	C															4		
Sudan (French)	C															4		
Upper Volta—Banfora	C																2	

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

BY THE UNITED STATES
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SPECIAL ARTICLES

Survey of Public Health Service in Knox County, Tenn.
The Adjustment of pH of Hanging Drop Tissue Cultures

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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④# PUBLIC HEALTH REPORTS

VOL. 46 AUGUST 21, 1931 No. 34

PUBLIC HEALTH SERVICE IN KNOX COUNTY, TENN.

FISCAL YEAR JULY 1, 1929–JUNE 30, 1930

By Joseph W. Mountin, *Surgeon, United States Public Health Service*

Introduction

SOCIAL AND ECONOMIC DATA

Knox County forms part of the Great Valley of east Tennessee. It has an area of 624 square miles and a population of 50,093, exclusive of Knoxville.[1] With the exception of about 3,000 negroes, the population is mostly native white. The county is essentially rural; there is no incorporated town in the county outside of Knoxville. The population of the several unincorporated villages is estimated to be as follows:

Fountain City	3, 917
Mascot	1, 700
Bearden	1, 257
Concord	1, 000
Powell Station	800
Inskip	693
Corryton	258

The county is traversed by ridges of low mountains with fertile valleys between. The soil is clay, with considerable mixture of sand. It is underlaid by limestone, and outcroppings are frequently seen. There is a well developed system of state and county roads, and all farms are said to be within one mile of an "all-weather" road.

Agriculture is the principal pursuit. Hay, corn, grain, and garden truck are the principal crops. Knoxville receives the major part of its milk supply from dairies in Knox County. The two other major industries are marble quarries, which employ about 1,500, and zinc mines, which employ about 450 persons.

The assessed value of Knox County including Knoxville is $103,125,-470, and the tax rate is $1.25 on each $100 valuation.

[1] Knoxville, a city of 105,795 inhabitants, is the county seat. Since Knox County and Knoxville are quite distinctly separated in their political organization and public services, the data presented in this report relate to Knox County exclusively, except where specific mention of Knoxville is made.

RELATION OF KNOX COUNTY AND KNOXVILLE

From the social and political point of view Knoxville is quite independent of Knox County. The same is true to a lesser degree of the economic structure. The suburbs and satellite villages which usually surround a large city have recently been included within the city limits of Knoxville. The county, however, benefits in many ways from having Knoxville within its borders. Knoxville pays a large part of the county taxes; it affords a ready market for the farm products; and the rural people have access to many social and economic advantages which attain a higher development in centers of population.

HEALTH ORGANIZATION

Prior to July 1, 1928, the health organization of the county consisted of a part-time county physician and two visiting nurses. The program, for the most part, was the care of the sick poor and the handling of such complaints and emergencies as demanded attention.

On July 1, 1928, Knox County, in cooperation with the Tennessee State Health Department, organized a county health department to serve the area outside the city limits of Knoxville. The personnel of the county health department proper consists of 1 full-time medical health officer, 2 public health nurses, 1 sanitary officer, and 1 clerk. The total annual budget is $14,500, of which $9,500 is appropriated by the county and $5,000 is obtained from the State. The county Red Cross chapter in conjunction with the county tuberculosis society contemplates the employment of a nutrition worker. The State health department, in addition to its allotment of $5,000, renders consultation service in the several specialized branches of public health work.

The county physician and one visiting nurse now devote their attention exclusively to the care of the sick poor. This service is carried on a special budget separate from that of the health department.

The several elements of the health program are described in succeeding sections of this report. This report is based on a study of health service conducted in Knox County during the fiscal year July 1, 1929–June 30, 1930, and is not a study of the county health department alone. The existing service is studied in relation to the needs of the area without taking into account the fact that the present budget and personnel are not sufficient to meet these needs. In the section entitled "General Summary and Major Recommendations," appearing at the close of this report, a statement is made concerning the increase which should be made in the budget and personnel in order to carry out a program of sufficient scope and intensity to meet the needs of Knox County.

The Appraisal Form for Rural Health Work was used as a guide in estimating the quantity and quality of the existing service and in projecting a program designed to meet more nearly the needs of the area.

BIRTHS AND DEATHS

Birth and death rates of the rural portions of Knox County are influenced by the following factors: Many women during confinement and many of the actually ill persons are hospitalized in Knoxville; most of the child-caring institutions are located in Knoxville; the County Home and Beverly Hills Sanatorium are located in rural Knox County. The first two factors would tend to lower the birth rate, the death rate of infants, and death rates from diseases which are treated in hospitals. The last factor would tend to increase the death rates from tuberculosis and diseases affecting the aged. It is impossible to weigh these influences, since it has not been the practice of the county to classify deaths according to residence. The city of Knoxville segregates nonresident deaths, but the place of residence is not stated.

In reviewing the accompanying table, the following items arrest one's attention: The birth rate has been consistently lower than that for other east Tennessee counties and that for the State as a whole. In part this may be explained by births occurring in the Knoxville hospitals. The Knoxville physicians attending deliveries in the county may file such certificates in the city and the error escape the attention of the city registrar. The recorded low birth rate should be investigated, since it may be due to poor registration as well as other factors.

The typhoid fever death rate, while lower than that of the State as a whole, is still excessive. The diarrhea and enteritis death rate among children under two years of age is high and periodically assumes epidemic proportions. Death rates from typhoid fever and diarrhea and enteritis show a definite need for intensifying the immunization and sanitation program now in progress.

Heart disease shows an alarming increase, having risen steadily from 48.6 in 1918 to 140.8 in 1929.

The published tuberculosis death rate is remarkably high, but it is influenced to a great extent by Beverly Hills Sanatorium. During the years 1927, 1928, and 1929, respectively, 12, 25, and 46 deaths occurred which were chargeable to Knoxville. After deducting these, the rate, while high, is well below that of surrounding counties and that of the State as a whole.

The number of deaths from pellagra is astonishingly high—in fact, pellagra is a major cause of death. The general presence of the disease is usually considered to reflect adverse economic conditions; but the high rate of Knox County as contrasted with rates of other sections of the State is not in keeping with the relatively advanced position Knox

County is believed to occupy. Pellagra as it exists in Knox County deserves special study.

Births, and deaths from selected causes [1]

	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
Live births:												
Number	534	569	654	675	679	729	700	756	725	566	750	701
Rate	16.2	16.6	18.2	18.1	17.5	18.1	16.8	17.5	16.3	12.3	15.8	14.3
Stillbirths:												
Number	(2)	(2)	(2)	(2)	(2)	22	24	33	28	25	47	29
Rate	(2)	(2)	(2)	(2)	(2)	30.2	34.3	43.7	38.6	44.2	62.7	41.4
Total deaths:												
Number	335	291	344	329	376	409	363	449	472	451	478	554
Rate	10.2	8.5	10.0	8.8	9.7	10.2	8.7	10.4	10.6	9.8	10.1	11.3
Deaths under 1 month of age (neonatal):												
Number	16	10	23	9	17	20	26	21	37	23	16	19
Rate	30.0	17.6	35.2	13.3	25.0	27.4	37.1	27.8	51.0	40.6	21.3	27.1
Infant deaths (under 1 year):												
Number	37	19	45	37	30	46	46	41	54	57	47	53
Rate	69.3	33.4	68.8	54.8	44.2	63.1	65.7	54.2	74.5	100.7	62.7	75.6
Maternal deaths (143–150):												
Number	1	5	6	2	4	1	1	3	4	2	1	1
Rate	1.9	8.8	9.2	3.0	5.9	1.4	1.4	4.0	5.5	3.5	1.3	1.4
Typhoid fever (1):												
Number	4	4	8	4	7	3	0	8	4	5	5	3
Rate	12.2	11.6	22.3	10.7	18.0	7.5	0	18.5	9.0	10.9	10.5	6.1
Smallpox (6):												
Number	0	0	1	0	0	1	3	0	0	0	0	0
Rate	0	0	2.8	0	0	2.5	7.2	0	0	0	0	0
Measles (7):												
Number	0	0	3	1	0	2	2	0	0	2	3	1
Rate	0	0	8.4	2.7	0	5.0	4.8	0	0	4.3	6.3	2.0
Scarlet fever (8):												
Number	0	0	1	2	0	1	0	1	0	1	0	1
Rate	0	0	2.8	5.4	0	2.5	0	2.3	0	2.2	0	2.0
Whooping cough (9):												
Number	3	0	8	4	0	1	5	1	1	5	5	2
Rate	9.1	0	22.3	10.7	0	2.5	12.0	2.3	2.2	10.9	10.5	4.1
Diphtheria (10):												
Number	4	1	4	6	2	3	3	4	5	2	2	2
Rate	12.2	2.9	11.2	16.1	5.1	7.5	7.2	9.3	11.2	4.3	4.2	4.1
Influenza (11):												
Number	31	17	6	4	15	29	4	16	17	14	22	31
Rate	94.2	49.4	16.7	10.7	38.6	72.1	9.6	37.1	38.1	30.4	46.3	63.3
Tuberculosis, all forms (31–37):												
Number	52	54	58	41	53	56	41	52	68	51	65	87
Rate	158.1	157.1	161.8	109.9	136.3	139.2	98.3	120.5	152.4	110.7	136.8	177.5
Cancer (43–9):												
Number	13	11	11	9	14	10	14	16	13	12	20	28
Rate	39.5	32.0	30.7	24.1	36.0	24.9	33.6	37.1	29.1	26.0	42.1	57.1
Pellagra (54):												
Number	38	29	23	17	21	16	19	35	32	30	30	32
Rate	115.5	84.4	64.2	45.6	54.0	39.8	45.6	81.1	71.7	65.1	63.1	65.3
Heart disease, all forms (87–90):												
Number	16	18	34	25	29	41	36	35	46	50	57	69
Rate	48.6	52.4	94.0	67.0	74.6	101.9	86.4	81.1	103.1	108.5	119.9	140.8
Pneumonia, all forms (100–1):												
Number	30	16	28	30	15	40	26	24	31	22	33	35
Rate	91.2	46.5	78.1	80.4	38.6	99.4	62.4	55.6	69.5	47.8	69.4	71.4
Diarrhea and enteritis under 2 (113):												
Number	3	5	5	12	30	12	12	17	9	19	9	8
Rate	9.1	14.5	14.0	32.2	77.1	29.8	28.8	39.4	20.2	41.2	18.9	16.3
Acute and chronic nephritis (129):												
Number	25	24	17	29	25	38	27	38	27	30	47	40
Rate	76.0	69.8	47.4	77.7	64.3	94.5	64.8	88.1	60.5	65.1	98.9	81.6
Auto accidents (188c):												
Number	0	0	1	6	25	3	0	3	3	2	2	4
Rate	0	0	2.8	16.1	64.3	7.5	0	7.0	6.7	4.3	4.2	8.2

[1] The numbers and rates used in this table were prepared from the records of the State registrar of vital statistics, compiled on the basis of the calendar year.

[2] Not tabulated prior to 1923.

Total live birth and total death rates per 1,000 population; stillbirth, infant death, and maternal death rates per 1,000 live births; all other rates per 100,000 population.

Health Activities

REGISTRATION OF BIRTHS AND DEATHS

Knox County is in the registration area for both deaths and births, having been included when the State was admitted in 1917 and 1927, respectively. The county, exclusive of Knoxville, is divided into 15 registration districts, each under the charge of a local registrar. Certificates are collected by the local registrars and transmitted to the county health officer. The county pays the local registrars 25 cents for each certificate upon presentation of statement signed by the State health commissioner. There has been no check on the completeness of reporting of deaths since 1917 and none on births since 1926.

Upon receipt of the certificates by the health officer items are reviewed for completeness; and deaths are checked against reports of communicable diseases. To a limited extent, birth certificates are used as a means of locating new-born infants, but the resources of the department have not as yet made possible an extensive infant hygiene program. No other analyses or uses are made of certificates of births and deaths. Certain data are presented in the State annual vital statistical bulletin, but these gross figures are not adapted to local administration needs.

Comments.—Registration of births and deaths receives a score of 18 out of a possible 60 points. Eight of the 18 points are granted because the State is in the registration area. The greater portion of the loss in score is sustained because of failure to tabulate and analyze the information. The following recommendations are made:

Recommendations.—1. In view of the time which has lapsed since the last check of registration, the health department should determine the status of registration, more particularly of births.

2. The division of the county for purposes of registration should be studied as well as the efficiency of the individual registrars. Such changes in area and personnel as are indicated should be made.

3. Current tabulations such as those specified in the appraisal form should be made.

4. In order to assist in checking registration and visualizing the health problems of the county, certain data should be presented graphically.

5. The statistician of the State health department should be consulted regarding tables and graphs.

Other suggestions will be found in the "Manual for the Conduct of County Health Departments" and "The Record Manual," both published by the State health department.

COMMUNICABLE-DISEASE CONTROL

Control of communicable diseases is a function of the health department. Cases are reported by telephone or on a weekly morbidity

card. A large percentage of reports, particularly of minor diseases, are received on morbidity cards alone. Office index cards are made and then the original morbidity cards are sent to the State health department. Spot maps are prepared only for typhoid fever.

Cases of and deaths from certain diseases, 1929

	Deaths	Cases reported
Typhoid and paratyphoid	3	28
Diphtheria	2	17
Scarlet fever	1	40
Measles	1	60
Whooping cough	2	11

Control measures on the individual case may be instituted by either the health officer or the nurses. On an average, two visits are made on the major and most of the minor diseases.

A special communicable disease record is completed on cases of typhoid fever but on selected cases only of diphtheria and scarlet fever. An effort is made to determine the source of typhoid fever but not of other diseases. Cases of diphtheria are released on one negative culture. Release of all other diseases is based on the expiration of the time period specified in the State regulations.

Typhoid fever cases are accepted at all general hospitals in Knoxville, but the number hospitalized could not be ascertained. There are no provisions for the hospitalization of other diseases. Diagnostic service was rendered by the health officer in 24 instances.

Immunization against certain diseases is receiving due emphasis. The records of the health department show that 5,471 persons were inoculated against typhoid fever. The health department has a record of 2,626 persons who received the complete series of diphtheria toxin-antitoxin; but it is estimated that more than 80 per cent of these children were over six years of age. Smallpox vaccination is not compulsory for school attendance. It is estimated that less than 1 per cent of children entering school have been vaccinated. The health department vaccinated 427 persons.

Comments.—Communicable disease control practice receives a total score of 101.8 points out of a possible 175. The loss in score sustained was quite evenly distributed over the several items listed in the appraisal form under "Communicable Disease Control." Case reporting is fair, but the recording and analysis of essential data are not sufficient for good control practice or for a thorough study of the communicable disease problem. In view of the availability of the State branch laboratory, it would seem that the department might make greater use of this valuable aid in both diagnosis and control measures. Hospitalization is most essential in those cases requiring special care and where proper isolation can not be carried out in the

home. It should be possible to effect some arrangement with the city of Knoxville for hospitalization of selected cases. The immunization work could be made much more effective by reaching a larger percentage of the younger children. This is especially true of diphtheria which exacts its greatest toll among children below school age.

Recommendations.—1. The collection of more nearly complete data on individual cases and careful analyses of such data. The State epidemiologist should be consulted on this subject.

2. The observance of the State regulations as a minimum standard of control practice, especially with regard to release of typhoid fever and diphtheria cases.

3. The development of some plan whereby the facilities of the Knoxville General Hospital may be used by the county for selected cases of communicable disease.

4. The promotion of immunization of the children of preschool age against smallpox, diphtheria, and typhoid fever

5. The passage of the compulsory smallpox vaccination ordinance recommended by the State health department.

VENEREAL-DISEASE CONTROL

During the first 10 months of the period covered by this report, the county did not operate any venereal-disease control service. In May, 1930, a plan was effected with the city of Knoxville whereby for the payment of a very nominal sum patients of the county are accepted at the clinic of the Knoxville Bureau of Health. During May and June 48 patients were treated. Thirty-seven of these were already under treatment, while 11 were new admissions.

Comments and recommendations.—It is reasonable to assume that the venereal-disease problem of Knox County is not less than that of the average rural county and probably slightly increased by the proximity of a large city. With existing personnel and budget the present arrangement with the city is about all that can be done. It, however, adds to the burden of the city clinic, which is already overcrowded. While all efforts toward the common use of facilities is to be encouraged, such consolidation should not impair an existing service. It is only proper that the county should pay the cost of such service, including the additional equipment and personnel which may be needed. In developing its venereal-disease program, the county should begin by perfecting its clinic facilities. However, supplemental field service must not be neglected. Among these activities may be mentioned family case work, follow-up of delinquent patients, general measures in the field of social hygiene, and control of sources of infection.

TUBERCULOSIS CONTROL

Tuberculosis control is a joint function of the county health department and Beverly Hills Sanatorium. For purposes of clarity, each element of the service is described separately.

Field control.—Tuberculosis is a reportable disease, but practically all cases carried on the register are located through field clinics. One clinic per year is held in 12 different sections of the county. Some local building is used for clinic quarters. The clinician is supplied by Beverly Hills Sanatorium, and field nursing service is rendered by the county health department. The clinic work is very much in the nature of a consultation service to the local physicians, who continue to supervise the patients. Nursing service is performed as an aid to the family physician. During the year, 306 patients were seen at the clinics; in 299 the diagnosis of positive or suspected tuberculosis was made. Practically all of these patients were seen at least once by the nurses, who made a total of 942 home visits. Patients are admitted to the sanatorium from the field clinics, and on their discharge from the sanatorium the county health department is notified.

Beverly Hills Sanatorium.—This institution is located in Knox County proper. It is maintained jointly by Knox County and Knoxville for the care of tuberculosis patients.

Bed capacity

Available beds	161
Normal operating capacity [1]	150
Extreme capacity	175
Average census (1929)	133

Classification of patients admitted

Adults	161
Children under 12 years	28
Total	189
	Per Cent
Incipient	20
Moderately advanced	30
Far advanced	50

Operating cost (present budget)

Knox County	$45, 000
Knoxville	45, 000
Knoxville Community Chest	8, 582
	98, 582
Per patient-day cost	1. 91

Twenty-seven county patients were admitted during 1929.

[1] Present budget permits operation of 150 beds at $1.91 per day.

Comments.—The tuberculosis-control service receives a score of 63 out of a possible 100 points. An unjust penalty in score is sustained because of deaths in Beverly Hills Sanatorium, but correction can not be made because there is no record of Knox County deaths occurring elsewhere. While case reporting receives full score, practically all cases of which the health department has knowledge were located through clinics. An excellent beginning on clinic and nursing service has been made, but there is need for expansion of both. Once during the year is not sufficiently often to conduct a clinic at a given place. Unless the clinic service can be increased, it would seem desirable to conduct clinics at fewer points but more frequently. The county proper is not taking full advantage of the facilities at Beverly Hills Sanatorium, there being 27 admissions from the county outside of Knoxville and 162 from Knoxville. On the basis of population, there should be about 60 admissions from the county.

Recommendations.—1. Epidemiological and statistical study to determine causes of high death rate. Consideration should be given such factors as county institutions, marble quarries, zinc mines, etc.

2. More frequent clinic sessions at a given place and fewer points for the location of clinics.

3. Increase in nursing service.

4. Greater utilization of beds at Beverly Hills Sanatorium by the rural portion of the county.

5. Consideration of the feasibility of developing an out-patient service at Beverly Hills Sanatorium especially for X-ray diagnosis.

PRENATAL HYGIENE

The total number of births recorded as occurring in the county in 1929 was 739, of which 710 were live and 29 stillborn. It is estimated that, in addition, 15 per cent of births occur in Knoxville hospitals and are credited to Knoxville. It is therefore assumed that 850 pregnancies constitute the total problem in prenatal service. About 12 per cent of the births were registered for prenatal nursing service. Six per cent of the births were attended by midwives. Midwives are not licensed and are not under systematic supervision.

Prenatal hygiene service conducted by the health department is limited to field nursing. The physician who is to attend the woman at confinement is engaged for prenatal medical supervision. The exact number of cases carried by the nurses was not ascertained, since the service is not of a formal character until contact is made with the physician. About 100 patients may be classed as receiving nursing service, and to these 288 visits were made. At least 90 per cent of these patients made one or more visits to a physician.

Comments.—Prenatal hygiene service receives a score of 46.3 out of a possible 75 points. The loss in score was quite evenly distrib-

uted over the several items of service performed by the health department. Full score was granted on obstetrical service because more than 10 per cent of deliveries occur in hospitals and less than 10 per cent of births are attended by midwives.

Recommendations.—1. Increase in number of patients for both medical and nursing prenatal service and greater frequency of contact by doctors and nurses.

2. The opening of some record on all cases contacted by nurses.

3. The development of some arrangement with the Knoxville General Hospital whereby indigent patients may obtain prenatal medical supervision and obstetrical service.

INFANT HYGIENE

The program of the health department in infant hygiene is limited to a small amount of home nursing service. The nurses visited 79, or about 10 per cent of the births, making a total of 178 visits. Most of these infants were located when homes were visited for other purposes. Not more than 50 per cent of the infants visited by nurses were under the supervision of the family physician, and these infants would not average more than two visits per year to the physician.

Comments and recommendations.—It may be said that the health department has no infant hygiene program. The small beginning in nursing activities is a casual type of service rendered to infants, for the most part seen by chance in connection with other work. The whole program of infant welfare needs to be developed. It would seem that the first step to be taken should be to establish a limited number (not more than 3 or 4) of permanent infant welfare stations at strategic points. In the beginning a liberal policy concerning the clientele should be adopted; yet an effort should be made from the start to transfer infants to family physician after a specified number of visits. At the same time a definite program should be started for the development of interest in preventive pediatrics on the part of the physicians. The nursing program should be developed as a service supplementary to the work of the physician on the case and under his direction.

PRESCHOOL HYGIENE

The preschool hygiene program is directed essentially toward the detection and correction of physical defects in children about to enter school. During the summer, clinics are conducted at various points throughout the county. Children needing corrective work are followed up by the nurses. Other aspects of the preschool hygiene work have not been undertaken.

Comments and recommendations.—Preschool hygiene work receives a score of 23 points out of a possible 50 points. This score is attained

on the basis of quantity of work performed. The greatest deficiency in the program lies in the fact that children are not reached until they are about to enter school. Preschool hygiene should be a continuation of the health supervision begun in infancy. The plan of organization suggested for infant welfare work is equally applicable for the preschool child. The preschool child might well be handled in a combined infant and preschool program. The supervision need not be so close as the child grows older; otherwise there is no difference.

SCHOOL HYGIENE

The school population is composed of 9,487 grade children and 1,513 pupils in high school. The school hygiene program, with the exception of classroom instruction in health, is an exclusive activity of the health department.

During the year 4,525 children of all grades were examined, at the rate of about 15 per hour. The present program, however, provides for the examination of the first and fifth grades only. Of the children examined last year, 2,803 were found to have physical defects; 422 of these children are known to have had defects corrected. The nature of the defects found and the number corrected have not been tabulated.

Systematic weighing is done only in connection with routine examination. Parents are invited to be present at these examinations, but less than one per cent attend. The results of the examination are communicated to parents by notice. Nurses made 506 field visits in an effort to induce correction of defects.

School buildings are inspected at least twice each year by the health department. Fifty per cent of the school buildings have a sanitary method of excreta disposal, but facilities are not adequate in many of these schools. Lavatory facilities are present in only 3 per cent of the schools. The seating, lighting, and ventilation are not considered satisfactory except in the newer consolidated schools and in the high schools. Eighty-seven per cent of the schools have water supplies which are classed as protected from surface pollution. The drinking-water facilities are satisfactory in less than 50 per cent of the schools.

Formal health instruction is carried out by classroom teachers in the fourth, fifth, and sixth grades. Other work, such as poster making, essay writing, and systematic observance of health habits, is carried on in possibly 10 per cent of the schools. In a survey made by the specialist in health education of the State health department it was found that health education as conducted was not of a systematic character and could not be considered as meeting the minimum requirements of the State course of study. Systematic physical education is given in three of the high schools. Courses are conducted

but not well organized in the other high schools and in a few of the grade schools.

Comments.—School hygiene work receives a score of 56.3 out of a possible 150 points. While loss in this score is distributed over the several items, the most severe penalties are sustained because of the small number of defects corrected and because of the unorganized program of health education. Systematic weighing by teachers has not been done in the past, but the purchase of scales by schools is contemplated and regular weighing is planned as part of the nutrition program being sponsored by the health department in cooperation with the board of education, the Red Cross, and the Tuberculosis Association. The health department is following good practice in limiting its examination to children of the first and fifth grades. This should make possible a more careful type of examination and greater concentration on children needing closer supervision. In the future, child hygiene for all ages should be considered as a unit, and work with the school child should be a continuation of a program of supervision begun in infancy.

The health department has exercised good judgment in emphasizing the necessity of having a protected water supply and sanitary method of excreta disposal at the schools. As rapidly as possible, however, other parts of the school sanitation program must be put into effect, such as sanitary drinking facilities, proper seating, lighting and ventilation, and better care of school grounds and sanitary facilities.

A comprehensive program of health education must be developed. As early as possible the State course of study should be put into effect. The health department must assume a more active part in stimulating interest on the part of the teachers and school authorities. The assistance and advice of the specialist in health education of the State health department should be secured. Teachers should be induced to enroll in health courses now being given at the State University and the teachers' colleges.

Recommendations.—1. Purchase of scales by all schools and systematic weighing by teachers.

2. Until personnel of health department is increased, not more than 3,000 children should be examined per year.

3. Defects should be tabulated by type, and efforts at correction should be concentrated on those of greater importance.

4. Greater effort should be placed on having parents present at the time of examination and using other methods for inducing correction of defects, thus obviating the necessity of home visits by the nurses.

5. The sanitation program should be expanded to include all items of school sanitation, and the school authorities should be induced to assume a more definite responsibility for the care of sanitary facilities.

6. A comprehensive plan of health education should be inaugurated. The health department should guide and assist in the program, but the classroom teacher should carry the responsibility for systematic instruction.

SANITATION

Food.—Other than local grocery stores there are very few food-producing or dispensing establishments in the county. Most of the so-called restaurants are sandwich shops, conducted frequently in connection with filling stations and tourist camps. The health department exercises a limited amount of supervision over these establishments and during the year made 361 visits for purposes of sanitary control. Food handlers are not subject to regular physical examination.

Milk.—The health department does not exercise any systematic control over the milk supply. All cows in the county have been tuberculin tested under the "accredited area" program of the State and Federal departments of agriculture. A few chain grocery stores, particularly on the edge of Knoxville, handle milk produced under Knoxville supervision.

The American Zinc Co. operates a dairy which supplies the city of Mascot. The dairy is said to be producing milk which meets the requirements of the Standard Ordinance for grade A raw milk. Knoxville obtains a large part of its milk supply from Knox County. Thus, in a limited way the quality of milk consumed in Knox County is improved; but for the most part milk is produced on the premises or obtained from small dairies over which no sanitary control is exercised.

Water.—In Mascot, an unincorporated city of about 1,700 inhabitants, the American Zinc Co. operates a private water supply which serves about 500 people. The water is obtained from Flat Creek. After sedimentation and chlorination, it is exposed to ultraviolet rays. About 500 dwellings on the edge of Knoxville are connected to the Knoxville supply. A public supply for Fountain City is contemplated. Exclusive of those existing public supplies mentioned, water throughout the county is obtained from individual supplies. The prevailing type is the bored or drilled well. Springs are not a significant source of supply. It is estimated that about 70 per cent of the population obtains water from supplies which may be classed as reasonably well protected from surface pollution.

Excreta disposal.—About 50 dwellings in Mascot are connected to a private sewer which discharges into Flat Creek. The privy is the prevailing method of disposal in the remainder of the county. Since the organization of the health department, 2,886 dwellings, or approximately 25 per cent, have been provided with a sanitary method of disposal which in all but a few instances is a pit privy. It is esti-

mated that about 25 per cent of the homes are equipped with a sanitary method of excreta disposal, most of which are pit privies.

Malaria.—An occasional case of malaria is reported. *Anopheles quadramaculatus* mosquitoes have been found breeding in certain collections of water. The malaria problem is not regarded of sufficient importance from the public health point of view to justify more than local control measures on a selective basis.

Comments.—Sanitation receives a score of 98 out of a possible 175 points. In the main, the program is well adapted to the needs of the county, except that it is inadequate from the point of view of quantity. There are several unincorporated cities in which there is need for improvement in sanitation, such as a public water supply, sewerage system, and better control of the milk supply. The legal powers of these villages to pass ordinances, issue bonds, etc., should be investigated. In the absence of such legal authority, the local application of county ordinances might be considered. Such sanitary measures might be developed as private enterprises in the absence of authority for public expenditure.

Recommendations.—1. An increase in the intensity and an extension of the general sanitation program now being pursued. See also "Summary and Major Recommendations" regarding personnel.

2. The development in the small cities of a program more adapted to urban conditions.

3. See also School Hygiene (sanitation).

LABORATORY SERVICE

The county health department is not equipped to perform laboratory examinations of any type. All specimens are sent to a branch laboratory of the State health department, which is operated in conjunction with the Knoxville Bureau of Health laboratory.

Specimens submitted by county health department

Water	88
Tuberculosis	15
Diphtheria	2
Syphilis	15
Urine	132
Feces	2
Total	254

The records of the State branch laboratory show that 2,795 specimens were received from Knox County. The type of specimens was not ascertained.

Comments.—Laboratory service was allowed 50 out of a possible 70 points. While the records of the State laboratory show that more than the required number of specimens were examined for Knox

County, a deduction is made because of the failure of the health department to use the laboratory. From the above table it will be noted in particular that the laboratory was not used in the diagnosis and control of typhoid fever and only twice for diphtheria. In the section dealing with communicable disease control mention was made of the failure to use the laboratory.

Recommendations.—1. Greater use of laboratory by health department, especially for the control of communicable diseases.

2. Immediate reporting by State branch laboratory to county health department of all positive communicable disease examinations.

3. Annual report by State branch laboratory to county health department of all specimens by type and purpose of examination.

POPULAR HEALTH INSTRUCTION

The county health department distributes literature supplied by the State health department. The material obtained from the State health department has been insufficient in amount and some of it is not up to date. This deficiency, however, is being corrected, since all bulletins and leaflets are being revised and printed in liberal quantities.

The use of motion pictures and slides is confined to those obtained from the State health department. Because of the heavy statewide demands on this equipment, the use of motion pictures has been limited to 10 showings, which were attended by 1,525 persons.

The health department prepares a monthly statistical and short narrative report. One copy is sent to the State health department and a copy is filed with the county court. A summary of the monthly report and occasional news notes appear in the Knoxville newspapers only, as there are no other newspapers in the county. Members of the department gave 143 lectures, which were attended by 12,036 persons. One exhibit was prepared and placed at the East Tennessee fair.

Comments and recommendations.—Popular health instruction received 10 out of a possible 20 points. The small budget has made it necessary for the local health department to depend on the State for most of its material.

A county of the size and wealth of Knox County should develop its own material and not depend to such an extent on the State health department.

The monthly report prepared by the health department should be summarized in a manner suitable for popular consumption and should be given wide distribution. An annual report of a formal character should be compiled and it, too, should be summarized and widely circulated. The publicity director of the State health department should be consulted concerning the whole subject of popular health instruction.

Summary and Major Recommendations

SUMMARY

Knox County is a well-developed, agricultural county in east Tennessee. The population of the county, exclusive of Knoxville, is 50,093. The taxable wealth, including Knoxville, is $103,125,470, and the tax rate is $1.25 on each $100 valuation. The county taxes the city of Knoxville but does not assume any part of the financial burden for city government or city services.

Organized, full-time health service was started in Knox County on July 1, 1928. The present personnel of the county health department consists of 1 medical health officer, 2 public health nurses, 1 sanitary officer, and 1 clerk, all serving on a full-time basis. The total cost of this service is $14,500, of which $9,500 is appropriated by the county and $5,000 is contributed by the State health department. The total per capita expenditure for public health is 28.4 cents, but the per capita expenditure for this service by the county proper is 18.9 cents, which represents a tax of nine-tenths of a cent on each hundred dollars valuation. The exact expenditure for the care of the sick poor by the county physician was not ascertained, but in all probability it does not exceed the expenditure for public health.

The county contributes $45,000 for the support of the Beverly Hills Sanatorium. Thus it will be seen from the data presented in the body of this report that the public expenditures in Knox County for health and care of the sick are both inadequate and unevenly distributed, since more is spent for the hospitalization of a single disease causing about 10 per cent of the mortality than for the prevention and treatment of all other diseases.

Public-health service has been rated according to the Appraisal Form for Rural Health Work developed by the American Public Health Association. The total points allowed by the Appraisal Form in a perfect score and the score attained by Knox County are given in the following table:

Knox County score by the appraisal form

Item of service	Appraisal form allowance	Knox County score	Per cent
Vital statistics	60	18.0	30.0
Communicable-disease control	175	101.8	58.2
Venereal-disease control	50	7.5	15.0
Tuberculosis control	100	63.0	63 0
Prenatal hygiene	75	46.3	61.7
Infant hygiene	75	5.7	7.6
Preschool hygiene	50	23.0	46.0
School hygiene	150	56.3	37.5
Sanitation (food, milk, water, sewerage)	175	98.0	56.0
Laboratory	70	50.0	71.4
Popular health instruction	20	7.0	35.0
	1,000	476.6	47.6

The score attained is 476.6 points out of a possible 1,000 points. This score, while low in comparison with accepted standards, is indicative of more service than might be expected from the expenditure. In a measure the disparity between score and expenditure is due to special effort on the part of the health department personnel, but to a greater degree it is due to the fact that many citizens take advantage of facilities provided by Knoxville.

The program of the Knox County health department has been concentrated on three activities, viz, examination of school children, immunization, and construction of sanitary privies. While other activities are included in the program, they have not been developed to the same degree as those mentioned.

Emphasis on the examination of school children may be justified in the beginning as a means of quickly reaching a large percentage of the population. In the future greater good to the individual child will probably come by spending a corresponding effort on younger children and by limiting school work to those children in need of special attention. Immunization and improvement of methods of excreta disposal are fundamental, but the work in immunization, especially against diphtheria, should be concentrated on the younger children.

Some improvement in practice as well as in score should result from better record keeping. This change need not await an expansion of the personnel.

No great improvement in the service or increase in the score can be expected without an increase in personnel and expenditure. Knox County should rapidly expand its service to the point where at least $1 per capita is being spent for health protection. The personnel of the health department should consist of not less than two medical officers, six public health nurses, two sanitary officers, and two clerks.

The service of the health department will be impaired in its effectiveness unless there is a corresponding development of medical service for those unable to purchase such service. In the development of facilities for medical service, special attention should be given to venereal disease clinics, hospital care of communicable diseases, prenatal and obstetrical service, dental care, and facilities for the correction of the common physical defects of children. It will probably prove more economical for the county to contract with the city of Knoxville for many of these clinical services.

A grave defect in the plan of public health service is the absence of any organized method whereby the health department can be interpreted to the general public. The health department is likewise handicapped in not being able to obtain a true expression of public opinion at all times. Until this situation is remedied, health work will

encounter difficulty in holding its place among the established and accepted public services.

MAJOR RECOMMENDATIONS

1. Increase in funds and personnel of the health department.
2. Improvement in records and reports.
3. Concentration on young children of work in child hygiene, immunization, and tuberculosis control.
4. The establishment of permanent health centers in at least three sections of the county.
5. An increase in the availability of medical service, especially those services which supplement the work of the health department.
6. The development of some plan of public relations whereby health will become more definitely integrated with the general program of public service and community improvement.

A TECHNIQUE FOR ADJUSTMENT OF pH OF HANGING DROP TISSUE CULTURES

By W. R. Earle, *Cytologist, Division of Pharmacology, National Institute of Health, United States Public Health Service* [1]

INTRODUCTION

One point which is a constant source of difficulty to users of the tissue culture technique is the maintenance of a constant hydrogen-ion concentration in the culture medium. While this can be overcome by buffering the solutions heavily with phosphates, it must be recognized that for much work a less abnormal, and consequently more desirable, method lies through the use of carbonates as buffers. One instance of this has been especially clearly demonstrated by the work of Warburg, Posener, and Negelěin (1), who have shown that in the absence of sufficient amounts of carbonates the glycolysis of many cells is tremendously inhibited.

Bicarbonates have indeed been generally used as buffer salts in the various media used in tissue culture, but this use has raised difficulties, owing to the rapid loss of CO_2 from the solutions of these salts, with a resultant rapid drift of the reaction of the solution toward alkalinity. An example of this may be cited from our own work. A series of cultures was planted in hanging drops of plasma and embryo juice, each culture containing a little phenol red. The initial pH of the

[1] The experimental work reported in this paper is part of an investigation into the nature of cancer, which is in progress in the division of pharmacology of the National Institute of Health. This work has been carried on under the supervision of Prof. Carl Voegtlin, chief of the division of pharmacology, to whom the author wishes to express his appreciation for suggestions and criticisms. The author wishes also to express appreciation of the valuable technical assistance of Mr. E. L. Schilling in carrying on this work.

cultures, as shown by the phenol red, was approximately 7.0, but after two hours' incubation at 38° all the cultures had drifted to approximately pH 8.1–8.4, owing to the loss of CO_2 from the solution.

Under such conditions as these, for the proper use of the bicarbonate buffer system for the maintenance of a constant pH level, it appears essential that some means be devised for increasing the pressure of CO_2 in the gaseous phase overlying the culture fluid. This has been attempted by several observers but has, in such instances, necessitated the use of special culture dishes and, in some instances at least, has not been applicable to conditions under which the living cells could be subjected to critical microscopic study with facility.

Probably the simplest of these techniques, and at the same time one of the most satisfactory from the point of view of microscopic study of the cells, is that of Carrel (2). In this technique a circular metal ring of 5 cm. diameter and 1 cm. depth is used. The top and bottom openings of this ring are closed by sheets of mica sealed on with paraffin. In the dish so formed, the cultures are mounted in hanging drops adherent to the inner surface of one of the mica slips. Four such cultures are planted in each dish, together with a single hanging drop of medium containing a little phenol red. The pH of the cultures is then adjusted by blowing the expired air from the lungs (rich in CO_2) through a small side aperture in the dish until the suspended drop of phenol red and medium shows the desired pH. The side aperture is then sealed, the CO_2 from the expired air serving to hold the pH of the hanging drops of culture medium at the proper level.

In the course of certain work concerning the influence of the hydrogen-ion concentration on cell metabolism, a technique has been worked out in this laboratory for cultivating cells in hanging drops *in vitro*. This technique appears to offer certain advantages over various existing procedures, as follows: (1) No special culture dishes are needed; the hanging drop is incubated on cover slips sealed to the usual hollow-ground slides. (2) The accessory apparatus needed is simple and may be constructed in almost any laboratory. (3) The technique is rapid of operation and allows of planting and maintaining a series of 25, or even more, cultures under comparable conditions of pH and CO_2 tension. (4) The cultures may be handled and examined with the same facility with which regular hanging drop cultures mounted on hollow-ground slides may be examined.

MATERIAL AND METHODS

In this technique hanging drop cultures were prepared on mica slips and were sealed to hollow-ground slides in the usual manner; the only difference was that through the seal of each culture there projected a small glass capillary tube. As they were prepared the

cultures were laid face down on a wet towel to prevent drying. When the whole series had been planted, the cultures were placed in a sealed vacuum desiccator fitted with a gas stirring device. The vessel, together with the contained slides, was then partially evacuated. An amount of CO_2 necessary to produce the pH desired was then run into the vessel, after which air was run in until the desiccator was at atmospheric pressure. The stirring device was run all the while. The result was that the mixture of CO_2 and air was sucked back into the chambers of the hollow-ground slides and so adjusted the pH of the hanging drop. The slides were then left for 20 minutes for equilibrium to be reached, after which the equilibration vessel was opened and the capillary tube of each slide was rapidly sealed with a drop of vaseline. The slides were examined and incubated in the usual manner.

The materials used in the technique may be summarized as follows:

The slides used were approximately 75 by 40 by 3.5 mm. in size. The diameter of the concavity of each slide was 27 mm., and the depth was approximately 1.8 mm.

The coverslips used were of mica, approximately 35 by 50 mm. in size. Care was taken in the selection of cover slips that were free from cracked or split areas, as it was found that these often allowed a leakage of gas sufficient to produce a marked change of pH even though no signs of leakage of culture fluid could be found on casual examination.

The capillary tubes used were readily drawn down from a larger size of tubing. This was a 5-mm. diameter Pyrex tubing with a 1-mm. bore. Using this sized tubing, and heating it with a large burner of the Meker type, it was found that a capillary approximately 16 to 24 inches in length gave the diameter desired. Each capillary was then examined by running the fingers along it to detect uneven places. Such uneven places were discarded. A short piece was then broken off from each end of each capillary and examined from the end by means of a low-power binocular microscope, and the diameter of the bore was measured by means of an eyepiece micrometer. In this way capillary tubing of an internal diameter of from 0.1 to 0.25 mm. was selected. This was then broken up into 25-mm. lengths and sterilized by dry heat.

The vaseline used for the inner seal on the slides was a very heavy grade of yellow petroleum jelly.

Commercial paraffin of about 56° m. p. was used.

Commercial CO_2 sold in cylinders was used. The cylinder of gas was used with the usual type of pressure-reducing valve.

As an equilibration vessel for the slides during the process of adjustment of the CO_2 tension, a heavy wall desiccator of 10 inches internal diameter was used. The desiccator had a tubulature through the lid. This tubulature was closed with a rubber stopper, through which passed two stopcocks, as shown in Figure 1.

The stirring device used in this vessel, though made from materials at hand, has proved very satisfactory. It consisted of an electric bell, from which the gong, clapper, and frame had been removed, while to the clapper bar a "flapper," or fan, of cardboard about 1½ inches square had been fastened by means of sealing wax. The whole machine was bolted to a strip of metal 2 inches long and one-half inch wide. The upper end of this metal strip was then fastened to the inside surface of the rubber stopper, which closed the tubulature, by means of a small wood screw which passed through a hole in the metal strip and screwed directly into the rubber stopper. Electrical connections for the stirrer were passed through the rubber stopper by means of two small steel needles pushed through the stopper and connected on the inside of the jar with wires running to the coils of the stirrer. Connections were made to these needles, outside the vessel, by means of wires to the end of which small "bull dog" artery clamps were soldered. In order to eliminate sparking at the contact point of the armature, with consequent production of ozone, a third connection was run through the rubber stopper. This joined the stationary armature contact point of the gas stirring device, inside the jar, while outside the jar it was connected to one terminal of a condenser of 4 mf. capacity. The other terminal of the condenser was connected to one of the wires running direct to the coil of the stirring device.

In equilibrating the cultures with a mixture of carbon dioxide and air, it is essential that these gases be saturated, or at least almost saturated, with water vapor, otherwise the evaporation of water from the medium on the slides would be so great as to injure the cultures. In order to insure the saturation of the gases, two trains of "saturation bottles" were used, one train for each gas. Each train consisted of four bottles, each with inlet and outlet tubes, and with a glass stopcock. The arrangement in each bottle was designed so as to make the gas pass over as large a moist surface as possible in order to insure rapid saturation with water vapor. To accomplish this, the lower end of the inlet tube in each bottle was fitted to the tube of a 1½-inch diameter funnel, the mouth of which reached to within 1½ inches of the bottom of the jar. Around this funnel 10 layers of loosely woven cheesecloth were tied, through which the gas had to pass. The jar was filled with water to such a level that this cheesecloth was just below the water surface. Further, from the top of each jar a strip of cheesecloth 6 inches wide and 24 inches long was suspended by means of a pin through its ends. The cheesecloth was wadded into the jar so that it dipped below the surface of the water but so that most of its bulk was loosely packed above the level of the funnel mouth and provided a large moist surface over which the gas had to pass. When necessary, water was added through the stopcock with which each jar was fitted. These jars were all stoppered with

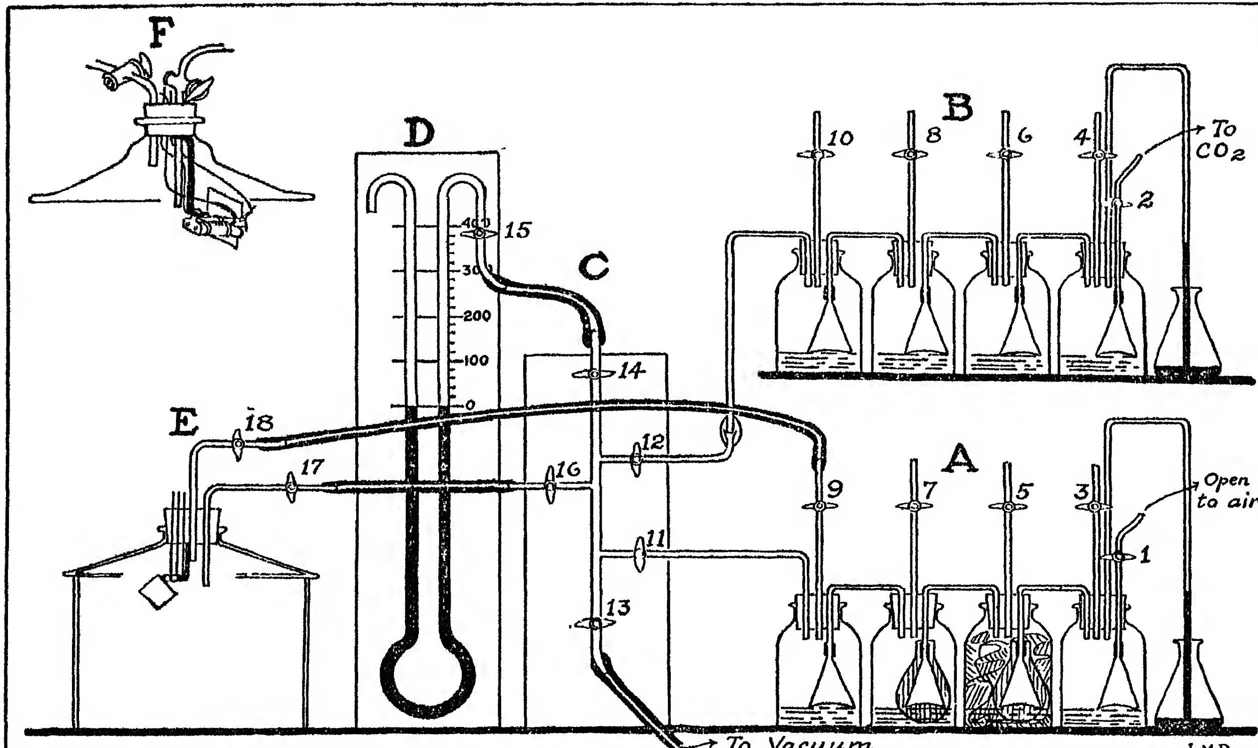

FIGURE 1.—Diagram of equilibration apparatus. A and B are the "saturation trains," to saturate the air and CO_2 used, with water vapor. In jar 7 is shown the arrangement of the cloth wrapped around the funnel, while in jar 5 the arrangement of the loosely packed cloth in the jars is also shown. C is the manifold, D the manometer, and E the equilibration vessel. More detail of the gas mixing device on the equilibration vessel is shown in the insert F

rubber stoppers; and when the connections were all completed, the outside of the rubber stopper and the top of the jar were covered with hot sealing wax. In addition, each train of jars was fitted with a combined vacuum gauge and safety valve, as shown in Figure 1.

It may be noted that all stopcocks used in this and other parts of the apparatus were of Pyrex glass, as a good deal of trouble was experienced with stopcocks of softer glass, due to leakage.

After having passed through the "saturation bottles" the gas was controlled through a manifold which had connections for the tubes leading from the "saturation bottles," manometer, and vacuum, and an outlet leading to the equilibration vessel. The construction of this manifold may be seen from Figure 1. A source of vacuum that would exhaust to about 300 mm. of mercury was used.

After setting up the apparatus the "saturation trains" were well flushed out with their respective gases and then sealed off. Just preceding use they were again flushed out for a minute or so, using a fairly rapid stream of gas.

The procedure in the preparation and equilibration of the cultures may be outlined as follows:

Just preceding the planting of the cultures each slide to be used in the preparation of the cultures was taken, and on one end of the slide a capillary tube was laid. The length of the tube ran approximately parallel with the length of the slide. One end of the tube projected over the concavity of the slide about 2 mm. Then, by means of a pipette filled with melted vaseline,[2] a heavy ring was laid down around the concavity of the slide and run over the capillary tube. This ring was a little thicker than the external diameter of the capillary tube. As these slides were prepared they were placed, face down, in a sterile tray designed to hold them.

The hanging drop of culture medium was placed on a sterile mica slip and spread out over a circular area of about 10 to 12 mm. The cell clump was planted in this area and the culture was then covered by one of the slides, prepared as described. Care was taken to see that the internal end of the capillary tube did not touch the drop of medium. The slide was then pressed down on the culture, gently and evenly, so that the vaseline made firm contact with the mica on all sides.[3] The culture so prepared was then laid over on a very damp towel, face down. This damp towel served to prevent evaporation from the slide during the time the other cultures of the series were being planted.

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[2] Care should be taken to heat vaseline, or paraffin, which might come in contact with the culture medium, as little as possible, as with excessive heating it splits down with the liberation of substances which cause the death of the cells.

[3] Later work with this technique has shown that a more satisfactory seal can be made by making one vaseline ring on the slide, as above detailed, and another similar ring on the mica coverslip, and then, pressing the slide down on the coverslip, so uniting the two vaseline rings.

Several control slides, each containing a drop of medium plus a little phenol red, were also planted.

Following the completion of the planting, each culture was sealed by having a coating of melted paraffin layered around the edge of the coverslip.[4] Care was taken at this stage to make sure that no large bubbles of air were left between the vaseline and paraffin seals, as such bubbles were sometimes found to break through the vaseline seal and cause leaks.

Several pads of gauze, each about 5 cm. square, were next soaked with water. A total of 10 c. c. of water was used. These pads were distributed along the internal surface of the wall of the equilibration jar, and adhered to the wall by their contained moisture. The slides were then stacked in the jar. In this process care was taken that the capillary tube of each slide was free from any obstruction which might be offered by other slides. The most convenient form found for this stacking was a series of "staggered" piles of slides, with the capillary tube of each slide projecting clear. The equilibration vessel was then closed and sealed. Vaseline was found satisfactory as a sealing agent. The two stopcocks of the desiccator were than connected by rubber pressure tubing with cocks 9 and 16, respectively, as shown in Figure 1. These tubes were as short as possible for convenient manipulation. Electric connections were then made to the three needles projecting through the rubber stopper of the equilibration jar, and the mixing device within the jar was set in operation.

Moist air was then drawn through the equilibration jar, in order to displace as much as possible of the unsaturated air in the jar. This was done by opening cocks 1, 9, 18, 17, 16, 14, and 15, and by controlling the flow by means of cock 13. This was continued for about three minutes, during which time the flow was rather rapid. Cocks 13, 9, and 18 were then closed.

The equilibration jar was then exhausted 300 mm. in pressure. This was done slowly, so that the process took about three or four minutes, as rapid exhaustion often caused leaks to show up later in the cultures. This exhaustion was carried on by opening cock 13. When this exhaustion had been accomplished cocks 13 and 16 were closed.

The manifold of the apparatus was then flushed out for about one minute with CO_2. To do this cocks 2 and 12 were opened, while the flow was controlled by cocks 2 and 13. Cocks 13 and 12 were then closed. The pressure of gas in the manifold was then lowered to that in the equilibration jar. This was done by use of cock 13.

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[4] Later work with this technique has shown that a far more satisfactory sealing agent than pure paraffin can be made by dissolving about 2 to 4 per cent of pure white crepe rubber in paraffin. This was done by cutting the rubber very fine and heating it, with constant stirring, with the paraffin, at about 150° for about an hour. This mixture was applied to the slides, by means of a pipette, very hot, so that it ran easily under the coverslip, but not so hot that it would melt through the inner vaseline seal and come in contact with the culture medium.

Cock 16 was then opened, and by regulating the flow of gas by means of cock 12 the proper number of millimeters pressure of CO_2 was run into the equilibration chamber. Cocks 16 and 12 and 2 were then closed.

The gas manifold was then flushed out with air. This was done by opening cocks 1 and 11, and by controlling the flow by means of cock 13. Cocks 13 and 11 were then closed.

The pressure in the manifold was then lowered to that in the equilibration jar. This need be only very approximate, and in practice the pressure in the manifold has generally been set somewhat higher than that in the jar. This was done by means of cock 13. This cock was then closed.

Air was then slowly run into the equilibration vessel until the pressure in the vessel was atmospheric. This was done by opening cock 16 and controlling the flow by means of cock 11. All cocks were then closed; cocks 11, 16, and 17 were closed first and in the order given.

With the mixing device running, the equilibration jar was then left for 20 minutes. Following this period of equilibration the jar was reopened, and then, without delay, a drop of melted vaseline was placed on the exposed end of the capillary tube on each slide. This made a satisfactory seal, but was a little troublesome to handle, as the vaseline was soft. For the sake of convenience in handling, this drop of vaseline was covered by several drops of melted paraffin. Once this external seal was applied, the cultures could be handled in the same manner and with almost the same facility as the regular hanging drop cultures.

DISCUSSION

We have found this method of equilibrating hanging drop cultures fairly rapid. In running a series of 50 cultures the preparation of slides and the actual planting of the cultures was probably slowed down about 15 minutes, while after the cultures are planted they were equilibrated and sealed in about 45 minutes. Once the equilibration apparatus was set up it took but little care.

This method of adjustment of the pH of the cultures has the objection that, theoretically at least, the gases to which the unsealed slides are exposed, while largely saturated with water vapor, are probably never completely saturated, and therefore there must be at least some evaporation from the hanging drop cultures. In order to get some idea of the rate of evaporation from the cultures during the process of equilibration the following test was made:

Into each of two shallow weighing bottles, each having a diameter of 4.8 cm., 10 c. c. of water was measured. Each bottle with its contents was then weighed and the weights were recorded. Following this, one of the bottles was left open in the room for one hour; the other was placed inside the equilibration chamber and exhausted

500 mm. The vacuum was slowly released and the vessel was then left to equilibrate for one hour. At the close of that time each bottle, with its contents, was weighed. The bottle exposed to the air of the room showed a loss, by evaporation, of 0.4063 gm., while the one subjected to the extreme form of equilibration process showed a loss of only 0.0346 gm. Inasmuch as this represented the evaporation of water from a surface of approximately 18 sq. cm., the evaporation from a surface of 1 sq. cm. would have been approximately 0.002 gm. If it be considered that in the equilibration process all evaporation from the cultures, other than that needed to saturate the air within the chamber of the slide, must pass through a capillary tube having a maximum bore area of 0.00049 sq. cm., and a length of 25 mm., the small amount of evaporation which would take place from each slide is readily apparent.

As a final check on any damage which any part of the process of preparation and equilibration might have caused to the cultures, a number of series of cultures of chick heart, from chicks of eight days' incubation, were set up in plasma and embryo juice. In each of these series some of the cultures were sealed at once, while others were equilibrated by the process under discussion to a pH of approximately 7.6. Each series was run approximately five to seven days. In no instance was there any sign of damage to the equilibrated cultures, and in most of the cultures examined the growth of the equilibrated cultures was markedly better than that of the cultures sealed at once.

Several sizes of capillary tubes have been tried and the size above mentioned has been adopted as being most satisfactory. Some tubes of 0.05 mm. diameter were tried, but these gave very irregular results, whereas with extremely large-sized tubes, after the gas mixture has been run into the slides, and the equilibration vessel has been opened, the interval of time required to seal the series of 30 slides sometimes allowed so much CO_2 to diffuse out through the tube that the pH in the last cultures of the series was altered. Using the tubes of the size specified, no difference in the pH of slide 1 and slide 30 of the series of slides examined has been noted. This has been the longest series of slides so far studied by this method.

While the process of preparation of these tubes appears rather laborious, it has been found that with a little practice about 100 tubes could be made in an hour. Once made they may be used over and over after proper cleaning.

After having worked out an approximate pH calibration curve for the culture medium used, by equilibration of various lots of the medium with different tensions of CO_2 by means of the apparatus under discussion, little trouble was experienced in setting the pH of a series of cultures approximately to any pH level desired within the range of pH 7.0 and 8.0. This range is the only one which has so far

been examined, but it could certainly be extended if desired. Further, if it is desired, correction may easily be introduced for barometric pressure, although where it has not been necessary to set the pH precisely at one exact level, this has not been done. No special precautions have been necessary for temperature control, other than that of using the apparatus in a room the temperature of which was about 23° C.

In order to test the accuracy that might be expected of the adjustment of the pH in the cultures of any one series equilibrated by this

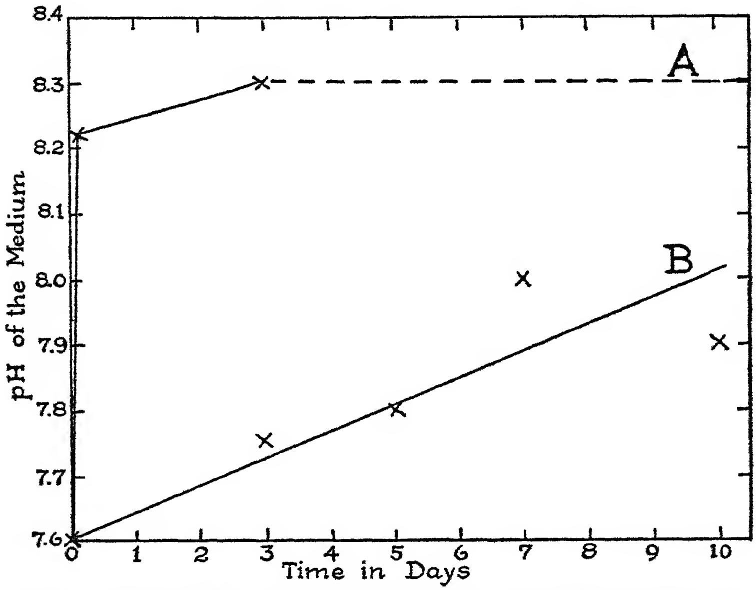

FIGURE 2.—Curves showing the change in the pH of two types of hanging drop preparations of culture medium. The medium used in these preparations was Tyrode solution, which contained 1 g. sodium bicarbonate per liter. Curve A shows the pH drift in a hanging drop mounted on a culture slide and sealed in the usual manner. The Tyrode solution used in this preparation had first been brought to a pH of 7.6 with dilute HCl, and was at this pH when the preparation was made. The dotted portion of the curve was beyond the alkaline limit of the pH indicator used, and could merely be approximated as alkaline to pH 8.2. Curve B shows the drift in a similar drop of Tyrode solution, to which no HCl was added, but which was mounted and treated by the equilibration technique described in the text

technique, several series of preparations containing hanging drops of medium plus phenol red were set up and examined. No tissue was added to such preparations. Neither at the time the preparations were completed nor later has a variation of more than 0.2 in pH between the different slides of a series been found at any one time, except in those few slides that showed obvious leaks. For the slides of any one series the drift of pH in the preparations as a function of time was generally about 0.2 in 5 days. A graph showing the drift of one representative series of preparations is shown in Figure 2.

A preliminary attempt has been made to adapt this technique to the use of flask cultures. In this attempt the regular Carrel D flasks were used, and the mouth of each flask was closed with a rubber stopper through which a capillary tube passed. This allowed the contents of the flask to be equilibrated by the general process above outlined for hanging drop cultures on slides. Our data on this subject are, however, not sufficiently complete to allow us to give the exact details of the process and the precautions necessary.

BIBLIOGRAPHY

(1) Warburg, O., Posener, K., and Negelein, E.: Ueber den Stoffwechsel der Carcinomzelle. Biochem. Zeitschr. (1924), **152**, 309.

(2) Carrel, Alexis: La technique de la culture des tissus en goutte pendante. Compt. rend. des Séances de la Société de Biologie (1929), **102**, 742.

COURT DECISION RELATING TO PUBLIC HEALTH

Certain statutory provisions concerning narcotic drugs held repealed by implication.—(Montana Supreme Court; State *v.* Brennan, 300 P. 273; decided Apr. 25, 1931.) The defendant was convicted of selling morphine hydrochloride and his punishment was fixed at 10 years' imprisonment in the State prison and a fine of $3,000. On appeal, the supreme court stated that the principal question necessary for determination was which of certain sections of the Revised Codes of 1921 was controlling.

By an act of 1895 (sec. 11239 of the Revised Codes of 1921) the sale or disposition of "any morphine, opium, cocaine, chloral-hydrate, or any of their compounds" was regulated. Punishment for violation of the act was a fine not exceeding $200.

In 1911 the legislature passed a law (secs. 3186–3188 of the Revised Codes of 1921) regulating the sale, furnishing, or disposition of "any opium, morphine, alkaloid-cocaine, or alpha or beta eucaine, or codeine or heroin, or any derivative, mixture, or preparation of any of them." Violation of this law was made punishable by a fine of not less than $50 nor more than $500, or by imprisonment in the county jail for not less than 60 days nor more than 100 days, or by both such fine and imprisonment.

By a 1921 enactment (secs. 3189–3202 of the Revised Codes of 1921) it was made unlawful "for any person to sell * * * at retail, or to a consumer, opium or coca leaves, or any compound, manufacture, salt, derivative, or preparation thereof, * * * except upon the original written prescription of a duly licensed physician." Section 3202, prescribing the penalty for violation of the act, was amended in 1925, and, as amended, made the unlawful possession or control of

any of the drugs mentioned in the law punishable by a fine of not less than $500 nor more than $3,000 and by imprisonment in the State prison for not less than one year nor more than five years. The unlawful disposition of any of the drugs to a person over 18 years of age was made punishable by a fine of not less than $1,000 nor more than $3,000 and by imprisonment in the State prison for not less than five years nor more than ten years, while the unlawful disposition to a person of 18 years or under was made punishable by imprisonment in the State prison for not less than five years nor more than life. In 1927 the legislature amended section 3186 by adding marihuana (*Cannabis indica*) to the drugs mentioned in said section, but the penalty was not changed. In 1929 section 3186 was again amended, but in unimportant particulars so far as the instant case was concerned.

In discussing the drugs mentioned in section 3186 the supreme court said:

> * * * Opium is defined as a drug consisting of the inspissated juice of the opium poppy; morphine, the principal alkaloid of opium, therefore, is in some manner manufactured from opium. Cocaine is an alkaloid obtained from coca leaves; it is commonly called "cocaine," but technically "alkaloid-cocaine." In section 3186 reference is next made to "alpha or beta eucaine"; eucaine is "eucocaine," "eu" being a prefix signifying "well, good, advantageous"; clearly it is derived from cocaine; it has two distinct forms "a" and "b" (Alpha and Beta) and is used in the form of hydrochlorides. Codeine is an alkaloid associated in opium with morphine; therefore, extracted in some manner from opium. Heroin is a derivative of morphine, which in turn comes from opium. See Webster's Int. Dictionary. Therefore every drug mentioned in section 3186 is obtained in some manner from opium or coca leaves, and the courts take judicial notice of the fact that morphine is a derivative of opium. State *v.* Vallie, 82 Mont. 456, 268 P. 493.

The court then stated that the legislature in the 1921 act (secs. 3189–3202) dealing with "opium or coca leaves, or any compound, manufacture, salt, derivative, or preparation thereof," included every drug mentioned in section 3186 and clearly intended to enact an entirely new and more drastic law upon the subject, and that "when it did so, section 3186 was thereby repealed in toto." The court also stated that it was manifest that the legislature intended that, from the date of the 1921 act, the violation of the prohibition against traffic in narcotic drugs should be a felony instead of a misdemeanor as theretofore, and that, as the 1921 act entirely superseded and repealed the 1911 act, section 3202, the penalty section of the 1921 act repealed section 3188, the penalty section of the 1911 act.

In the case of State *v.* Mah Sam Hing, 295 P. 1014, decided February 2, 1931, the court had said that the 1927 and 1929 amendments to section 3186 superseded section 3189. With regard to such statement the court said: "In this we were wrong." After reference to a statutory provision declaring that "an act amending a section of an act

repealed is void," the court declared that both the 1927 and 1929 acts were void, since they attempted to amend section 3186 which had been impliedly repealed by section 3189.

One of the defendant's claims was that the information was faulty because it did not charge that the morphine decoction was not sold upon a duly licensed physician's or veterinarian's prescription. The statute recognized an exception where morphine was so sold. But it was held that there was no merit to this contention, as section 3200 specifically provided that it should not be necessary to negative any of the exceptions stated in the statute, the burden of proof as to his coming within the exceptions resting upon the accused person.

The claim that the information was defective because it contained no statement as to the age of the purchaser of the morphine was also rejected. The court said that the defendant should not be heard to complain since the trial court had instructed the jury respecting the maximum and minimum penalty prescribed for making an unlawful sale of morphine to a person over 18 years of age and had said nothing respecting the more severe penalty. "Since the punishment meted out to the defendant," said the court, "was less than the penalty prescribed for a sale of such drugs to a person under 18 years of age, and within the limits prescribed for a sale to a person over 18 years of age, the rights of the defendant were in no manner affected injuriously."

The judgment of the trial court was affirmed.

DEATHS DURING WEEK ENDED AUGUST 1, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended August 1, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended August 1, 1931	Corresponding week, 1930
Policies in force	75, 015, 314	75, 961, 722
Number of death claims	12, 678	13, 785
Death claims per 1,000 policies in force, annual rate	8. 8	9. 5
Death claims per 1,000 policies, first 31 weeks of year	10. 2	10. 0

Deaths [1] from all causes in certain large cities of the United States during the week ended August 1, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Aug. 1, 1931				Corresponding week, 1930		Death rate [2] for the first 31 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,305	10.7	618	[4] 48	10.9	665	12.6	12.5
Akron	39	7.9	8	79	6.3	3	8.0	8.1
Albany [5]	37	14.9	4	79	11.4	4	14.4	15.3
Atlanta	62	11.6	6	61	11.3	7	15.8	16.6
White	31		3	48		3		
Colored	31	(6)	3	86	(6)	4	(6)	(6)
Baltimore [5]	220	14.1	21	71	15.8	23	15.2	14.6
White	171		16	69		14		
Colored	49	(6)	5	78	(6)	9	(6)	(6)
Birmingham	60	11.6	6	60	13.8	14	14.3	14.4
White	27		6	103		10		
Colored	33	(6)	0	0	(6)	4	(6)	(6)
Boston	191	12.7	19	54	10.8	10	14.9	14.8
Bridgeport	28	9.9	4	66	7.1	1	11.7	11.9
Buffalo	129	11.6	17	69	10.9	12	13.8	13.5
Cambridge	22	10.1	0	0	9.6	0	12.8	12.4
Camden	30	13.1	4	70	14.1	5	14.9	14.3
Canton	26	12.7	3	69	10.4	2	10.7	10.6
Chicago [5]	673	10.1	55	49	9.7	54	11.4	10.9
Cincinnati	129	14.7	16	96	16.6	11	16.6	16.1
Cleveland	163	9.3	20	58	8.5	12	11.7	11.7
Columbus	70	12.4	3	29	15.2	9	14.4	16.8
Dallas	49	9.4	6		14.1	5	11.9	12.0
White	34		3			5		
Colored	15	(6)	3		(6)	0	(6)	(6)
Dayton	42	10.6	4	56	12.6	4	12.5	10.5
Denver	65	11.6	3	29	12.6	10	14.6	14.9
Des Moines	35	12.6	2	35	11.7	2	11.8	12.3
Detroit	228	7.2	19	30	7.6	22	8.8	9.9
Duluth	24	12.3	2	49	6.2	0	11.1	11.5
El Paso	31	15.4	4		14.7	6	16.9	18.4
Erie	20	8.9	3	56	9.0	0	10.8	11.5
Fall River [5] [7]	21	9.5	1	23	9.0	1	12.1	12.8
Flint	13	4.1	0	0	8.9	5	7.5	9.5
Fort Worth	33	10.3	0		10.5	5	11.4	11.4
White	28		0			4		
Colored	5	(6)	0		(6)	1	(6)	(6)
Grand Rapids	22	6.7	4	59	8.3	2	9.4	10.9
Houston	58	9.8	7		7.9	5	11.5	12.5
White	35		6			3		
Colored	23	(6)	1		(6)	2	(6)	(6)
Indianapolis	90	12.7	4	33	13.0	8	14.4	14.9
White	83		4	38		5		
Colored	7	(6)	0	0	(6)	3	(6)	(6)
Jersey City	65	10.6	9	80	9.4	5	12.2	12.0
Kansas City, Kans	32	13.6	3	62	7.7	1	13.5	11.4
White	26		3	74		1		
Colored	6	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo	94	12.0	11	83	13.2	10	14.0	13.6
Knoxville	21	10.0	2	43	13.7	3	13.1	14.4
White	16		2	48		2		
Colored	5	(6)	0	0	(6)	1	(6)	(6)
Long Beach	28	9.6	1	24	12.0	1	10.1	10.1
Los Angeles	246	9.7	17	49	9.8	18	11.1	11.4
Louisville	56	9.5	9	77	20.3	8	14.9	14.0
White	40		5	49		7		
Colored	16	(6)	4	265	(6)	1	(6)	(6)
Lowell [7]	20	10.4	5	127	11.9	1	13.1	14.3
Lynn	16	8.1	1	26	11.2	2	10.5	11.3
Memphis	68	13.7	7	74	20.5	12	17.0	18.2
White	39		3	50		7		
Colored	29	(6)	4	116	(6)	5	(6)	(6)
Miami	21	9.7	2	51	8.5	2	12.4	11.8
White	16		2	71		0		
Colored	5	(6)	0	0	(6)	2	(6)	(6)

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended August 1, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Aug. 1, 1931				Corresponding week, 1930		Death rate [2] for the first 31 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Milwaukee	62	5.5	7	30	8.9	10	9.8	10.1
Minneapolis	100	11.0	5	32	10.0	6	12.0	10.9
Nashville	52	17.4	7	104	18.6	10	17.3	17.0
White	34		5	100		6		
Colored	18	(6)	2	118	(6)	4	(6)	(6)
New Bedford [7]	28	13.0	3	80	6.5	2	13.1	11.7
New Haven	52	16.7	4	76	10.3	1	12.7	13.6
New Orleans	122	13.6	11	60	13.9	16	17.6	18.2
White	67		8	66		13		
Colored	55	(6)	3	49	(6)	3	(6)	(6)
New York	1,387	10.2	106	44	9.0	107	11.9	11.5
Bronx Borough	190	7.4	5	11	7.3	9	8.7	8.3
Brooklyn Borough	455	9.0	35	37	7.7	40	10.9	10.5
Manhattan Borough	535	15.4	49	83	13.3	45	18.1	17.1
Queens Borough	160	7.2	13	35	6.1	10	7.7	7.5
Richmond Borough	47	15.0	4	72	14.4	3	14.2	14.9
Newark, N. J	91	10.6	6	31	9.7	7	12.4	12.8
Oakland	41	7.3	1	13	9.5	4	10.8	11.3
Oklahoma City	37	9.8	5	69	9.7	7	11.5	10.6
Omaha	55	13.2	2	22	16.5	10	14.4	14.3
Paterson	32	12.0	3	52	10.2	2	14.1	12.8
Peoria	19	9.1	0	0	11.4	6	13.3	12.9
Philadelphia	390	10.3	28	41	13.2	60	14.0	13.2
Pittsburgh	180	13.9	20	69	12.6	22	15.6	14.5
Portland, Oreg	64	10.9	4	49	9.8	0	12.0	12.8
Providence	65	13.3	6	55	9.5	2	13.5	13.9
Richmond	54	15.3	6	87	14.2	3	16.4	15.6
White	29		3	66		1		
Colored	25	(6)	3	130	(6)	2	(6)	(6)
Rochester	52	8.2	6	55	10.1	5	12.4	12.0
St. Louis	179	11.3	10	34	14.2	10	16.3	15.0
St. Paul	46	8.7	2	21	7.8	1	11.3	10.6
Salt Lake City [5]	44	16.1	2	30	10.4	2	12.6	13.0
San Antonio	55	11.9	7		12.3	11	15.4	17.9
San Diego	37	12.3	3	61	11.2	0	14.2	14.7
San Francisco	155	12.4	13	86	13.1	6	13.3	13.4
Schenectady	18	9.8	0	0	9.8	2	10.7	11.7
Seattle	66	9.3	0	0	8.7	3	11.8	11.2
Somerville	9	4.5	0	0	9.0	2	9.6	10.3
South Bend	8	3.9	0	0	8.4	1	8.5	9.4
Spokane	31	13.9	2	52	8.6	0	12.6	12.8
Springfield, Mass	34	11.6	2	31	10.1	1	12.5	12.8
Syracuse	47	11.5	4	47	11.4	4	12.2	12.2
Tacoma	23	11.1	1	26	12.7	2	12.7	12.8
Toledo	56	9.9	4	37	12.0	4	12.5	13.2
Trenton	34	14.3	4	70	24.1	3	17.4	17.3
Utica	31	15.8	1	26	14.3	2	14.6	15.8
Washington, D. C	150	15.9	14	78	15.6	14	16.4	15.8
White	86		4	33		7		
Colored	64	(6)	10	172	(6)	7	(6)	(6)
Waterbury	13	6.7	0	0	7.8	0	10.0	10.4
Wilmington, Del.[7]	19	9.3	3	65	10.3	2	14.6	14.8
Worcester	42	11.1	2	27	9.6	4	12.9	13.6
Yonkers	21	7.9	1	26	8.1	0	9.0	8.4
Youngstown	27	8.1	1	14	10.1	6	10.9	10.5

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 8, 1931, and August 9, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 8, 1931, and August 9, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930
New England States:								
Maine	1	4		1	3	4	0	1
New Hampshire					1		0	0
Vermont		1			4	3	0	0
Massachusetts	31	35	1		53	56	1	3
Rhode Island	5	5			35	6	0	0
Connecticut	2	5	2		34	8	2	0
Middle Atlantic States:								
New York	58	56	[1] 1	[1] 3	378	230	12	21
New Jersey	12	31	2	1	48	109	3	5
Pennsylvania	38	48			151	166	7	4
East North Central States:								
Ohio	14	12	1	3	37	9	4	8
Indiana	8	13			16	6	3	4
Illinois	48	64		1	76	25	4	6
Michigan	11	36		1	21	71	3	6
Wisconsin	4	11	7	4	86	79	2	2
West North Central States:								
Minnesota	3	10	2		5	9	3	2
Iowa	3	3			1	1	0	2
Missouri	12	17		1	1	17	1	6
North Dakota	3				5	1	0	0
South Dakota	3	7			1		0	2
Nebraska	1	7			1	8	1	0
Kansas	6	1	1		10	14	0	1
South Atlantic States:								
Delaware	1	2			1		0	0
Maryland [2] [3]	10	3			21	3	0	0
District of Columbia	5	3			4	5	0	0
Virginia								
West Virginia	6	7	12		46	21	0	0
North Carolina [3]	27	33	1		38	2	1	2
South Carolina [3]	18	19	70	38	6	4	1	0
Georgia [3]	5	4	6	3	3	12	0	0
Florida	3	1		1	4	6	0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 13 cases; 2 cases in Maryland; 1 case in North Carolina; 1 case in South Carolina; 5 cases in Georgia; 2 cases in Alabama; and 2 cases in Texas.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 8, 1931, and August 9, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930
East South Central States:								
Kentucky		9			12	10	1	2
Tennessee	7	8	1	1	9	10	2	3
Alabama [2]	13	9		4	22	24	9	4
Mississippi	11	5					0	1
West South Central States:								
Arkansas	8	1		6	2		0	0
Louisiana	13	5	9	5		7	0	1
Oklahoma [4]	9	6	12	4		1	0	1
Texas [3]	27	22	7		1	21	0	1
Mountain States:								
Montana					8	4	0	0
Idaho						8	1	0
Wyoming					5	2	0	0
Colorado	6	3			3	11	0	1
New Mexico	5	6				1	0	0
Arizona	2	2			1	9	0	0
Utah [2]				4	5	6	0	2
Pacific States:								
Washington	3	12		3	6	20	2	1
Oregon	2	6	1	7	11	16	0	0
California	30	41	14	6	60	84	9	2

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930
New England States:								
Maine [5]	7	3	8	13	1	0	3	2
New Hampshire	0	1	2	1	0	0	1	2
Vermont	0	0	2	1	4	0	0	0
Massachusetts	67	23	67	48	0	0	8	5
Rhode Island	16	0	5	3	0	0	3	0
Connecticut	97	0	7	8	0	0	2	0
Middle Atlantic States:								
New York	676	25	118	51	2	0	34	27
New Jersey	55	1	26	23	0	0	7	8
Pennsylvania	1	8	85	52	0	0	49	37
East North Central States:								
Ohio	5	14	38	33	5	11	25	33
Indiana	1	2	21	10	17	33	13	13
Illinois	15	11	63	51	3	19	31	32
Michigan	17	0	70	53	5	17	10	18
Wisconsin	10	1	18	19	1	6	4	4
West North Central States.								
Minnesota	13	15	12	15	4	4	2	6
Iowa	3	1	8	8	10	19	4	2
Missouri	7	9	14	16	4	12	18	18
North Dakota	1	2	3	1	3	0	1	1
South Dakota	0	1	6	1	0	14	3	1
Nebraska	0	1	4	4	2	12	3	6
Kansas	0	23	10	11	14	11	13	17
South Atlantic States:								
Delaware	1	0	2	1	0	0	2	4
Maryland [2] [3]	1	0	7	7	0	0	4	60
District of Columbia	1	0	5	1	0	0	0	2
Virginia		2				1		
West Virginia	1	1	11	8	0	1	35	30
North Carolina [3]	5	4	34	19	1	3	8	66
South Carolina [3]	0	3	1	4	0	0	112	69
Georgia [3]	3	1	11	13	1	0	59	58
Florida	0	0	0	1	1	0	3	1

[2] Week ended Friday.

[3] Typhus fever: 1931, 13 cases; 2 cases in Maryland; 1 case in North Carolina; 1 case in South Carolina; 5 cases in Georgia, 2 cases in Alabama; and 2 cases in Texas.

[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

[5] Supplementary report from Maine shows 11 cases of scarlet fever during the week ended August 1, 1931.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 8, 1931, and August 9, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930	Week ended Aug. 8, 1931	Week ended Aug. 9, 1930
East South Central States:								
Kentucky	2	0	13	5	0	10	45	79
Tennessee	2	0	10	11	3	1	127	77
Alabama [3]	0	0	23	16	1	0	68	32
Mississippi	0	3	12	2	9	1	57	34
West South Central States:								
Arkansas	0	6	2	1	4	4	40	26
Louisiana	0	27	10	6	3	0	71	40
Oklahoma [4]	1	10	7	15	7	27	42	83
Texas [3]	4	2	19	22	5	12	29	35
Mountain States:								
Montana	2	0	4	6	2	1	5	2
Idaho	0	0	6	3	0	0	0	0
Wyoming	0	0	1	1	0	0	0	0
Colorado	0	0	6	5	0	0	10	6
New Mexico	1	0	2	0	0	1	4	3
Arizona	1	0	0	2	1	0	2	1
Utah [2]	0	0	1	3	0	0	0	1
Pacific States:								
Washington	4	1	9	13	17	22	6	4
Oregon	0	0	1	1	14	3	8	10
California	9	56	28	34	15	15	25	25

[2] Week ended Friday.
[3] Typhus fever: 1931, 13 cases; 2 cases in Maryland; 1 case in North Carolina; 1 case in South Carolina; 5 cases in Georgia; 2 cases in Alabama; and 2 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June, 1931										
Florida	2	15	4	29	270	9	1	13	0	9
Kansas	5	31	1	2	365	2	2	82	224	21
New Hampshire		1					0	4	0	0
July, 1931										
Alabama	10	34	7	285	113	133	6	39	22	120
Arizona	1	7	2		18		0	5	0	16
Connecticut	3	37	3	1	410		49	65	0	10
District of Columbia	3	27			38		1	24	0	6
Florida	2	27	3	62	65	17	2	12	0	38
Iowa	2	10			38		2	66	110	7
Nebraska	1	9			4		1	15	27	10
New Hampshire		2					2	12	0	2
North Dakota	2	15			26		0	17	36	2
Tennessee	14	12	9	119	158	65	3	43	27	195
Vermont		1			111			35	43	0
Wyoming		1			13			10	4	3

June, 1931

	Cases
Florida:	
Chicken pox	41
Dysentery	2
Mumps	9
Paratyphoid fever	1
Typhus fever	3
Whooping cough	32
Kansas:	
Chicken pox	208
Food poisoning	1
German measles	5
Impetigo contagiosa	1
Mumps	394
Paratyphoid fever	2
Septic sore throat	7
Tetanus	2
Trachoma	1
Trench mouth	2
Tularæmia	3
Undulant fever	6
Vincent's angina	22
Whooping cough	221

July, 1931

	Cases
Anthrax:	
Connecticut	1
Tennessee	1
Chicken pox:	
Alabama	12
Arizona	11
Connecticut	87
District of Columbia	24
Florida	5
Iowa	46
Nebraska	46
North Dakota	8
Tennessee	17
Vermont	34
Wyoming	8
Dysentery:	
Arizona	4
Connecticut (bacillary)	1
Tennessee	26
German measles:	
Connecticut	8
Iowa	11
Impetigo contagiosa:	
Tennessee	2
Lead poisoning:	
Connecticut	3
Lethargic encephalitis:	
Alabama	6
Connecticut	5
North Dakota	1
Mumps:	
Alabama	21
Connecticut	75
Mumps—Continued.	
Florida	9
Iowa	30
Nebraska	79
North Dakota	10
Tennessee	18
Vermont	43
Wyoming	4
Ophthalmia neonatorum:	
Tennessee	3
Paratyphoid fever:	
Connecticut	1
Florida	1
Tennessee	4
Rabies in animals:	
Connecticut	5
Rocky Mountain spotted or tick fever:	
District of Columbia	5
Wyoming	2
Septic sore throat:	
Connecticut	5
Tennessee	2
Sprue:	
Tennessee	2
Tetanus:	
Connecticut	1
Trachoma:	
Tennessee	10
Trichinosis:	
Connecticut	1
Tennessee	1
Tularaemia:	
Iowa	1
Typhus fever:	
Alabama	7
Florida	9
Undulant fever:	
Alabama	1
Arizona	1
Connecticut	2
Iowa	4
Tennessee	3
Vincent's angina:	
North Dakota	37
Tennessee	3
Whooping cough:	
Alabama	81
Arizona	2
Connecticut	323
District of Columbia	139
Florida	42
Iowa	114
Nebraska	36
North Dakota	31
Tennessee	215
Vermont	74
Wyoming	35

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,729,000. The estimated population of the 89 cities reporting deaths is more than 31,175,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended August 1, 1931, and August 2, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	483	560	
96 cities	227	238	419
Measles:			
45 States	1,898	1,513	
96 cities	589	417	
Meningococcus meningitis:			
46 States	60	98	
96 cities	32	40	
Poliomyelitis:			
46 States	598	222	
Scarlet fever:			
46 States	882	747	
96 cities	298	235	293
Smallpox:			
46 States	179	260	
96 cities	13	21	16
Typhoid fever:			
46 States	908	930	
96 cities	171	111	120
Deaths reported			
Influenza and pneumonia:			
89 cities	312	318	
Smallpox:			
89 cities	0	0	

City reports for week ended August 1, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	1	0	0		0	0	0	0
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	1
Burlington	0	0	1		0	0	0	0
Massachusetts:								
Boston	13	17	12		0	11	6	8
Fall River	0	1	2		0	6	1	0
Springfield	0	1	1		0	0	3	1
Worcester	0	1	0		0	0	12	1
Rhode Island:								
Pawtucket	0	0	1		0	0	0	1
Providence	1	3	4	1	0	32	7	2
Connecticut:								
Bridgeport	3	2	0		1	4	1	1
Hartford	0	1	2		0	2	1	0
New Haven	0	1	0	1	0	0	0	2

City reports for week ended August 1, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	2	7	1	----------	1	9	1	14
New York	34	116	55	4	5	82	27	82
Rochester	2	2	0	----------	0	34	2	3
Syracuse	9	1	0	----------	0	7	0	3
New Jersey:								
Camden	0	3	2	----------	0	0	0	2
Newark	3	8	2	----------	0	9	1	4
Trenton	0	0	1	----------	0	3	0	1
Pennsylvania:								
Philadelphia	10	30	3	----------	2	23	9	14
Pittsburgh	6	11	5	----------	1	18	14	10
Reading	0	1	1	----------	0	3	1	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	3	4	----------	0	4	2	1
Cleveland	9	16	3	2	0	42	34	7
Columbus	0	2	2	----------	0	1	4	3
Toledo	14	2	1	----------	0	3	0	4
Indiana:								
Fort Wayne	0	0	0	----------	0	0	0	0
Indianapolis	0	2	1	----------	0	4	0	6
South Bend	----------	0	----------	----------	----------	----------	----------	----------
Terre Haute	0	0	1	----------	0	0	0	0
Illinois:								
Chicago	28	57	40	----------	1	139	15	24
Springfield	1	0	0	----------	1	0	0	0
Michigan:								
Detroit	8	24	9	----------	1	4	4	5
Flint	3	1	2	----------	0	0	1	1
Grand Rapids	1	1	0	----------	0	7	1	0
Wisconsin:								
Kenosha	1	0	0	----------	0	0	9	0
Madison	4	1	0	----------	----------	1	15	----------
Milwaukee	25	7	0	----------	0	51	43	1
Racine	1	0	0	----------	0	0	6	0
Superior	3	0	0	----------	0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	2	1	0	----------	0	0	1	0
Minneapolis	3	8	1	----------	0	4	0	0
St. Paul	8	4	1	----------	0	4	0	3
Iowa:								
Davenport	0	0	1	----------	----------	0	0	----------
Des Moines	0	1	0	----------	----------	0	0	----------
Sioux City	0	1	0	----------	----------	1	1	----------
Waterloo	0	0	0	----------	----------	0	0	----------
Missouri:								
Kansas City	0	1	1	----------	0	1	0	4
St. Joseph	0	0	0	----------	0	0	0	1
St. Louis	0	15	5	----------	----------	1	5	5
North Dakota:								
Fargo	0	0	0	----------	0	0	1	1
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Aberdeen	1	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	0	2	1	----------	0	0	2	2
Kansas:								
Topeka	2	0	0	----------	0	2	9	0
Wichita	0	1	0	----------	0	1	0	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	1	1	----------	0	2	1	1
Maryland:								
Baltimore	7	9	7	----------	1	5	4	14
Cumberland	0	0	0	----------	0	0	0	0
Frederick	0	0	0	----------	0	1	0	0
District of Columbia:								
Washington	2	5	0	----------	0	9	0	9
Virginia:								
Lynchburg	0	0	0	----------	0	0	0	0
Norfolk	0	0	0	----------	0	1	0	2
Richmond	0	2	1	----------	0	0	0	1

City reports for week ended August 1, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—continued								
West Virginia:								
Charleston	0	0	0		0	0	0	0
Wheeling	1	0	0		0	0	0	0
North Carolina:								
Raleigh	0	0	2		0	1	0	1
Wilmington	0	0	0		0	0	0	0
Winston-Salem	0	0	0		1	2	5	1
South Carolina:								
Charleston	0	0	0	1	0	0	0	3
Columbia	0	0	0		0	0	2	0
Greenville	0	0	0		0	0	1	0
Georgia:								
Atlanta	0	2	3		1	0	0	1
Brunswick	0	0	0		0	0	0	1
Savannah	3	0	0	3	0	3	2	1
Florida:								
Miami	2	1	1		0	2	0	1
Tampa	0	0	2		0	0	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	0	0	1
Tennessee:								
Memphis	0	1	0		0	6	0	3
Nashville	0	1	0		0	1	0	1
Alabama:								
Birmingham	0	1	0	1	1	0	0	3
Mobile	0	0	2		1	1	0	0
Montgomery	0	0	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			0	2	
Little Rock	0	0	0		0	0	1	1
Louisiana:								
New Orleans	0	5	6		0	0	0	8
Shreveport	0	0	0		0	0	0	6
Oklahoma:								
Muskogee	0	0	0		0	0	0	0
Texas:								
Dallas	0	3	12		0	0	0	2
Fort Worth	0	0	0		1	0	0	2
Galveston	0	0	0		0	0	0	0
Houston	0	2	0		0	2	0	3
San Antonio	1	1	0		0	1	0	3
MOUNTAIN								
Montana:								
Billings	0	0	0		0	16	0	0
Great Falls	1	0	0		0	1	0	0
Helena	0	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	0	0	1
Colorado:								
Denver	10	7	3		0	6	13	1
Pueblo	1	0	0		0	0	1	0
New Mexico:								
Albuquerque	1	0	0		0	0	1	0
Arizona:								
Phoenix	0	0	0		0	0	1	3
Utah:								
Salt Lake City	2	1	1		0	1	1	2
Nevada:								
Reno	0	0	0		0	0	0	1
PACIFIC								
Washington:								
Seattle	3	1	0			1	3	
Spokane	2	0	0			0	0	
Tacoma	1	2	1		0	1	2	2
Oregon:								
Portland	9	3	0		0	1	3	3
Salem	2	0	0		0	1	0	0
California:								
Los Angeles	4	22	20	3	2	12	3	10
Sacramento	3	1	3		0	7	1	3
San Francisco		7						

City reports for week ended August 1, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	0	0	0	0	2	1	0	0	3	27
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	8
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	4
Burlington	0	0	0	2	0	0	0	0	0	6	10
Massachusetts:											
Boston	19	15	0	0	0	10	2	1	0	20	191
Fall River	1	6	0	0	0	2	0	1	0	2	21
Springfield	1	3	0	0	0	1	1	1	0	3	32
Worcester	2	4	0	0	0	0	0	0	0	4	--------
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	11
Providence	3	3	0	0	0	1	0	1	0	1	65
Connecticut:											
Bridgeport	2	3	0	0	0	2	0	0	0	0	28
Hartford	0	0	0	0	0	2	0	1	0	13	29
New Haven	0	0	0	0	0	1	0	0	0	3	52
MIDDLE ATLANTIC											
New York:											
Buffalo	6	5	0	0	0	8	0	0	0	17	121
New York	35	44	0	0	0	100	20	19	3	225	1,387
Rochester	3	7	0	0	0	1	0	0	0	5	49
Syracuse	2	0	0	0	0	1	0	0	0	17	47
New Jersey:											
Camden	0	1	0	0	0	1	1	1	0	8	30
Newark	5	11	0	0	0	6	1	2	0	135	93
Trenton	1	3	0	0	0	3	1	0	0	1	34
Pennsylvania:											
Philadelphia	19	28	0	0	0	27	6	5	1	86	390
Pittsburgh	9	16	0	0	0	9	1	0	0	65	180
Reading	0	1	0	0	0	0	0	1	0	3	33
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	5	0	0	0	6	1	3	0	9	129
Cleveland	11	11	0	0	0	12	2	1	0	70	163
Columbus	2	1	1	0	0	3	0	0	0	8	70
Toledo	2	3	0	0	0	6	1	0	0	43	56
Indiana:											
Fort Wayne	0	1	0	0	0	0	0	0	1	0	23
Indianapolis	2	2	3	1	0	3	1	3	0	19	--------
South Bend	0	--------	0	--------	--------	--------	0	--------	--------	--------	--------
Terre Haute	0	0	0	0	0	0	0	0	0	0	19
Illinois:											
Chicago	35	36	1	0	0	47	5	6	0	174	673
Springfield	0	0	0	1	0	0	0	0	0	1	28
Michigan:											
Detroit	28	22	0	0	0	20	4	5	0	192	228
Flint	5	0	0	0	0	0	0	0	0	0	13
Grand Rapids	3	4	0	0	0	0	0	0	0	4	22
Wisconsin:											
Kenosha	0	0	0	0	0	0	1	0	0	1	7
Madison	1	0	0	0	--------	--------	0	0	--------	2	--------
Milwaukee	6	2	0	0	0	4	0	0	0	83	62
Racine	1	1	0	0	0	1	0	0	0	21	17
Superior	2	1	0	0	0	1	0	0	0	0	11
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	0	0	0	0	0	0	0	0	2	24
Minneapolis	11	2	1	1	0	3	0	0	0	5	100
St. Paul	7	6	1	0	0	3	1	1	0	17	--------
Iowa:											
Davenport	0	2	0	5	--------	--------	0	0	--------	3	--------
Des Moines	2	0	1	0	--------	--------	0	0	--------	0	35
Sioux City	0	0	0	0	--------	--------	0	0	--------	7	--------
Waterloo	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

City reports for week ended August 1, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
WEST NORTH CENTRAL—continued											
Missouri:											
Kansas City	2	0	0	0	0	6	1	5	1	7	94
St. Joseph	0	0	0	0	0	1	0	0	0	2	29
St. Louis	6	5	0	0	0	12	5	7	0	66	179
North Dakota:											
Fargo	1	0	0	2	0	1	0	0	0	10	10
Grand Forks	0	0	0	0			0	0		0	
South Dakota.											
Aberdeen	1	0	1	0			0	0		0	
Nebraska:											
Omaha	1	2	1	3	0	3	1	1	1	8	55
Kansas.											
Topeka	1	0	0	0	0	0	0	1	1	1	19
Wichita	1	1	0	0	0	1	1	0	0	5	26
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	1	0	0	0	1	0	0	0	5	19
Maryland:											
Baltimore	6	2	0	0	0	16	6	3	1	77	220
Cumberland	0	1	0	0	0	1	0	0	0	0	11
Frederick	0	0	0	0	0	0	0	0	0	1	2
District of Columbia:											
Washington	5	4	0	0	0	13	3	2	0	29	150
Virginia:											
Lynchburg	0	1	0	0	0	0	1	8	1	0	9
Norfolk	0	1	0	0	0	1	2	1	0	2	
Richmond	2	3	0	0	0	2	2	1	1	0	51
Roanoke	0	0	0	0	0	1	0	0	0	2	14
West Virginia:											
Charleston	0	0	0	0	0	0	1	3	0	2	6
Wheeling	1	0	0	0	0	1	0	0	0	0	23
North Carolina:											
Raleigh	0	3	0	0	0	0	0	0	0	6	10
Wilmington	0	0	0	0	0	1	0	1	0	3	8
Winston-Salem	0	0	0	0	0	2	1	1	0	10	12
South Carolina:											
Charleston	0	1	0	0	0	3	1	2	2	0	27
Columbia	0	0	0	0	0	1	2	4	0	0	7
Greenville	0	0	0	0	0	0	1	0	0	8	
Georgia:											
Atlanta	2	4	0	1	0	3	2	9	6	2	62
Brunswick	0	0	0	0	0	0	1	0	0	0	3
Savannah	1	1	0	0	0	5	2	4	0	2	33
Florida:											
Miami	0	2	0	0	0	1	1	0	0	0	21
Tampa	0	0	0	0	0	0	0	1	0	0	25
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	1		0	0	0	0	0	0	1	14
Tennessee:											
Memphis	1	0	0	1	0	3	9	4	2	11	68
Nashville	1	0	1	0	0	2	6	3	1	11	52
Alabama:											
Birmingham	1	0	1	0	0	5	5	0	0	4	60
Mobile	0	4	0	0	0	0	1	0	0	0	16
Montgomery	0	1	0	0			1	4		2	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0			1	1		0	
Little Rock	0	0	0	0	0	0	1	2	0	1	2
Louisiana:											
New Orleans	3	1	0	0	0	8	4	[1] 39	2	6	122
Shreveport	0	0	0	0	0	1	1	0	0	0	33
Oklahoma:											
Muskogee	1	0	0	1	0	0	1	0	1	0	

City reports for week ended August 1, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
WEST SOUTH CENTRAL—continued											
Texas:											
Dallas	2	4	1	0	0	3	3	8	3	15	49
Fort Worth	1	2	1	0	0	1	1	1	0	0	33
Galveston	0	0	0	0	0	1	0	0	0	0	17
Houston	1	0	0	1	0	4	2	0	0	0	58
San Antonio	1	1	0	0	0	3	2	0	0	2	55
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	2	[illegible]
Great Falls	0	1	0	0	0	0	1	0	0	4	5
Helena	0	0	0	0	0	0	0	0	0	1	6
Missoula	0	0	0	0	0	0	0	0	0	0	9
Idaho:											
Boise	0	1	1	0	0	0	0	0	0	0	3
Colorado:											
Denver	4	4	0	0	0	9	1	1	1	29	71
Pueblo	1	0	0	0	0	0	0	1	0	0	7
New Mexico:											
Albuquerque	0	0	0	0	0	3	0	1	0	0	9
Arizona:											
Phoenix	0	0	0	0	0	8	0	1	0	0	--------
Utah:											
Salt Lake City	1	1	0	0	0	2	0	0	0	15	44
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	2
PACIFIC											
Washington:											
Seattle	2	2	1	0	--------	--------	0	0	--------	22	--------
Spokane	0	0	0	2	--------	--------	0	0	--------	6	--------
Tacoma	1	0	1	0	0	2	0	0	0	11	23
Oregon:											
Portland	2	0	5	2	0	3	1	0	0	0	64
Salem	0	0	0	0	0	0	0	0	0	0	--------
California:											
Los Angeles	12	4	2	0	0	24	3	2	1	31	246
Sacramento	1	0	0	0	0	3	0	0	0	5	23
San Francisco	5	--------	1	--------	--------	--------	1	--------	--------	--------	--------

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis: Cases	Poliomyelitis: Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	0	1	0	0	0	0	1	12	1
Fall River	0	0	0	0	0	0	0	1	0
Springfield	0	0	0	0	0	0	0	4	0
Rhode Island:									
Providence	1	0	0	0	0	0	0	8	1
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	1	0
Hartford	0	0	0	0	0	0	0	3	0
New Haven	0	0	0	0	0	0	0	17	1
MIDDLE ATLANTIC									
New York:									
New York	9	2	2	0	0	0	5	404	55
New Jersey:									
Newark	0	0	0	0	0	0	0	4	0
Pennsylvania:									
Philadelphia	5	2	1	1	0	0	0	1	0
Pittsburgh	0	2	0	0	0	0	0	0	0

City reports for week ended August 1, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	1	1	0	0	0	0	0	0
Indiana:									
Indianapolis	2	0	0	0	0	0	0	0	0
Illinois:									
Chicago	6	1	2	1	0	0	0	2	1
Michigan:									
Detroit	1	0	1	0	0	0	1	2	1
Grand Rapids	0	0	0	0	0	0	0	2	0
Wisconsin:									
Madison	0	0	0	0	0	0	0	5	0
Milwaukee	0	0	0	0	0	0	0	3	1
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	6	1
Minneapolis	2	0	0	0	0	0	0	1	0
St. Paul	0	0	0	0	0	0	0	1	0
Missouri:									
St. Joseph	1	0	0	0	0	0	0	0	0
St. Louis	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	1	0	0	0	0	1	0	0
District of Columbia:									
Washington	1	1	0	0	0	0	0	1	0
Virginia:									
Lynchburg	1	1	0	0	0	0	0	0	0
West Virginia:									
Wheeling	0	0	0	0	0	0	0	1	0
North Carolina:									
Raleigh	0	0	0	0	1	2	0	0	0
Wilmington	0	0	0	0	3	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	1	0	0	0	0
Georgia:									
Atlanta	0	0	0	0	0	0	0	1	1
Savannah [1]	0	0	0	0	13	2	0	0	0
Florida: [1]									
Miami	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	1	0	0	0	0	0	0	0
Alabama:									
Mobile	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	1	0	1	0	0
Shreveport	0	0	0	0	0	2	0	0	0
Texas:									
Dallas	0	0	0	0	0	1	0	0	0
Fort Worth	0	0	0	0	0	2	1	1	0
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	0	2	0
New Mexico:									
Albuquerque	0	0	0	0	0	0	0	1	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	0	0	0
California:									
Los Angeles	0	0	0	0	0	0	2	3	0

[1] Typhus fever: 6 cases and 1 death; 3 cases at Savannah, Ga., and 3 cases and 1 death at Tampa, Fla.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended August 1, 1931, compared with those for a like period ended August 2, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, June 28 to Aug. 1, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930[1]

DIPHTHERIA CASE RATES

	Week ended—									
	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930
98 cities	[2] 47	57	43	58	42	48	33	37	[3] 36	38
New England	96	56	60	41	65	36	50	24	53	36
Middle Atlantic	53	56	50	49	35	46	34	33	31	34
East North Central	49	91	41	86	52	66	39	49	[4] 38	48
West North Central	33	37	31	68	31	39	33	35	17	35
South Atlantic	[5] 12	26	18	32	24	46	28	38	32	40
East South Central	12	36	23	24	29	12	12	24	12	6
West South Central	27	49	61	59	47	35	24	31	61	35
Mountain	[6] 9	9	17	26	61	70	35	70	35	35
Pacific	51	32	41	53	51	32	16	28	[7] 62	45

MEASLES CASE RATES

98 cities	[2] 384	270	316	252	181	147	133	105	[3] 94	67
New England	402	544	351	460	317	256	209	191	132	106
Middle Atlantic	283	322	311	305	142	195	111	144	84	87
East North Central	769	168	527	154	320	70	214	59	[4] 155	33
West North Central	143	139	103	130	61	50	34	64	27	43
South Atlantic	[5] 310	180	259	142	107	122	83	50	47	60
East South Central	349	126	116	179	116	42	105	54	47	36
West South Central	24	24	27	17	17	10	14	7	10	10
Mountain	[6] 215	731	122	582	122	247	174	176	209	159
Pacific	149	451	182	482	123	310	125	164	[7] 54	105

SCARLET FEVER CASE RATES

98 cities	[2] 105	75	79	71	70	53	53	49	[3] 47	38
New England	188	73	142	73	149	65	111	73	82	60
Middle Atlantic	135	54	89	49	64	35	56	34	52	21
East North Central	122	115	90	114	111	86	69	76	[4] 53	50
West North Central	31	105	44	85	42	43	29	31	31	48
South Atlantic	[5] 54	62	49	68	34	48	38	40	41	44
East South Central	47	12	52	42	23	18	6	48	35	6
West South Central	41	45	34	35	34	21	44	45	20	52
Mountain	[6] 36	167	52	88	26	79	0	26	61	62
Pacific	47	38	49	43	12	49	12	38	[7] 16	34

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Columbia, S. C., and Billings, Mont., not included.
[3] South Bend, Ind., and San Francisco, Calif., not included.
[4] South Bend, Ind., not included.
[5] Columbia, S. C., not included.
[6] Billings, Mont., not included.
[7] San Francisco, Calif., not included.

Summary of weekly reports from cities, June 28 to Aug. 1, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	July 4, 1931	July 5, 1930	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930
98 cities	[2] 6	6	2	7	3	6	3	7	[3] 2	4
New England	0	0	2	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	8	5	1	9	4	10	2	8	[4] 1	2
West North Central	10	14	4	10	4	14	10	21	11	12
South Atlantic	[5] 0	2	4	0	0	4	0	2	2	4
East South Central	23	18	6	18	0	0	6	18	6	0
West South Central	24	0	10	7	7	7	0	3	3	14
Mountain	[6] 0	53	0	9	0	18	0	18	0	0
Pacific	14	32	8	36	22	18	20	22	[7] 5	22

TYPHOID FEVER CASE RATES

98 cities	[2] 10	10	14	16	13	16	16	18	[3] 27	18
New England	10	7	2	5	12	10	10	7	12	7
Middle Atlantic	5	5	8	10	7	4	8	7	13	5
East North Central	3	1	5	6	6	9	5	13	[4] 11	12
West North Central	10	8	19	10	2	23	19	48	31	23
South Atlantic	[5] 10	28	28	60	47	44	69	42	77	52
East South Central	41	84	58	84	35	60	47	66	64	108
West South Central	71	45	81	35	57	59	10	38	169	42
Mountain	[6] 36	0	35	0	26	26	0	18	17	26
Pacific	4	4	6	14	6	16	27	10	[7] 5	16

INFLUENZA DEATH RATES

91 cities	[2] 3	4	3	3	2	2	1	2	[3] 3	1
New England	0	2	2	0	0	0	0	0	2	0
Middle Atlantic	1	4	4	4	0	3	1	1	4	0
East North Central	1	2	2	3	4	2	2	3	[4] 2	1
West North Central	9	0	0	6	3	0	0	3	0	0
South Atlantic	[5] 4	6	4	2	4	0	2	4	6	6
East South Central	19	6	6	13	0	0	0	0	13	0
West South Central	10	14	7	7	3	11	3	11	0	0
Mountain	[6] 9	0	0	0	0	9	0	0	0	0
Pacific	5	7	0	2	0	5	2	2	[7] 7	2

PNEUMONIA DEATH RATES

91 cities	[2] 64	54	59	53	47	43	44	56	[3] 49	52
New England	36	36	79	44	50	39	31	44	41	41
Middle Atlantic	67	55	59	54	61	54	55	68	59	59
East North Central	61	40	47	37	32	32	32	38	[4] 30	43
West North Central	77	63	88	75	71	39	53	57	47	48
South Atlantic	[5] 67	60	71	60	39	54	43	86	65	66
East South Central	82	142	50	71	44	52	44	91	50	52
West South Central	90	78	86	78	45	46	52	71	59	75
Mountain	[6] 72	62	61	106	35	53	17	79	44	62
Pacific	46	52	31	50	24	15	43	7	[7] 51	35

[2] Columbia, S. C., and Billings, Mont., not included.
[3] South Bend, Ind., and San Francisco, Calif., not included.
[4] South Bend, Ind., not included.
[5] Columbia, S. C., not included.
[6] Billings, Mont., not included.
[7] San Francisco, Calif., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended July 25, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended July 25, 1931, as follows:

Province	Cerebro-spinal fever	Typhoid fever	Influenza	Lethargic encephalitis	Polio-myelitis	Smallpox
Prince Edward Island [1]						
Nova Scotia [1]						
New Brunswick [1]						
Quebec	1	22			2	
Ontario		13	1	1	3	1
Manitoba		1				
Saskatchewan						19
Alberta [1]						
British Columbia		1	1		1	2
Total	1	37	2	1	6	22

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended August 1, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 1, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Mumps	5
Chicken pox	22	Paratyphoid fever	1
Diphtheria	20	Poliomyelitis	1
Erysipelas	4	Scarlet fever	22
German measles	1	Tuberculosis (pulmonary)	60
Influenza	1	Typhoid fever	24
Measles	44	Whooping cough	13

ECUADOR

Guayaquil—Deaths—1930.—During the year 1930 deaths from certain diseases were reported in Guayaquil, Ecuador, as follows:

Disease	Deaths	Disease	Deaths
Ancylostomiasis	13	Influenza	61
Bronchitis, acute	106	Leprosy	4
Bubonic plague [1]	4	Lethargic encephalitis	15
Cancer and other malignant tumors	48	Malaria	178
Cerebral hemorrhage and softening of the brain	63	Measles	36
Cirrhosis of the liver	22	Meningitis	60
Congenital debility and malformation	184	Nephritis (acute) and Bright's disease	12
Diphtheria and croup	1	Pneumonia and broncho-pneumonia	413
Diarrhea and enteritis (under 2 years)	152	Puerperal septicemia	69
Dysentery	83	Tuberculosis, all forms	785
Erysipelas	9	Typhoid and paratyphoid fever	17
Heart disease	91	Whooping cough	5

[1] 8 cases of bubonic plague, with 4 deaths, were reported in Guayaquil during the year 1930, the last case having been reported on Mar. 26, 1930.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931				June, 1931				July, 1931				August, 1931	
						9	16	23	30	6	13	20	27	4	11	18	25	1	8
Ceylon: Colombo	C			1					1	1									
	D								1	1									
China:																			
Canton	C				1			2				1							
	D							1											
Shanghai	C														P				
Swatow	C										3	1	6	7					
Tientsin	C								1		2	8							
	D								1			1							
India	C	15,334	11,544	8,968	11,462	3,242	3,013	3,565	3,784	3,932									
	D	8,123	6,131	4,550	5,767	1,806	1,598	1,845	2,021	2,146									
Bombay	C	21			2										1	11			
	D	9			1											6			
Calcutta	C	121	170	436	310	72	89	49	55	94	74	50	74	72	62	55			
	D	86	112	256	176	39	44	34	32	57	47	26	38	35	34	58			
Karikal	C		9	12	19	10		1	1										
	D		8	12	14	5		1	1										
Madras	C	99	72	20	26	18	23	11		3	6				2				
	D	47	20	10	13	6	8	2	1		4								
Negapatam	D	3	3																
Rangoon	C								2		2		2		1	2			
	D	1							1		1		1			1			
Tuticorin	C	1	1																
Vizagapatam	C												1						
India (French):																			
Chandernagor	C	1	5	7	6	3		1			1	2		1					
	D	1	5	6	5	3		1			1	2							
Pondicherry	C	19	100	100	24	3	8	2	4	1	1	1						1	
	D	11	34	18	4		3		4	1	1	1						1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8
Indo-China (see also table below):																			
Cochin-China—Rachgia	C																	P	
Pnompenh	C	4	9		2					1					1	4			
	D	2	5	1	1	2				1					1	1			
Saigon and Cholon	C	6	4	5	27	25	23	34	22	18	16	14	13	8	3	3			
	D	3	4	5	22	20	18	25	18	9	14	9	9	3	2	2			
Iraq: Basra	C																	3	9
	D																	2	8
Persia: Rafsanjan [1]	C					31	1	4											
	D					12		2											
Philippine Islands: [3]																			
Iloilo	C	2																	
	D	2																	
Provinces—																			
Capiz	C	59	180	48	29	11	3		3	4									
	D	47	146	41	24	11	3		1	4									
Cebu	C																		1
	D																		1
Iloilo	C	145	95	7						8	7	5	6	24	3				
	D	110	65	4						6	5	6	4	22	3				
Masbate	C			21															
	D			9															
Negros, Occidental	C	90	4										2						
	D	56	4										1						
Negros, Oriental	C	1																	
	D	1																	
Pampanga	C					1													
Siam	C	3	1	10	16	11	2	1			1	3			1				
	D	1		2	4	3	1	1			1	1			1				
Ayudhaya District	C			1															
Bangkok	C	3	2	3	3	1	1	1					1	1					
	D	1	1	2	2			1					1						
Bismulok Province	C			8															
	D			2															

On vessel:																			
S. S. Arankola, at Rangoon from Calcutta	C								1										
S. S. City of Eastborne, at Calcutta from Cocanada	C									1									
S. S. Tairea, at Penang from Calcutta	C										1								

Place		December, 1930	January, 1931	February, 1931	March, 1931			April, 1931			May, 1931			June, 1931	
					1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20
Indo-China (French) (see also table above):															
Cambodia [3]	C	28	62	125	14		65	36	22			44	40	83	96
Cochin-China [3]	C	8	24	29	30	33	33	22	40		1	52	75	71	69

PLAGUE

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended—													
						May, 1931				June, 1931				July, 1931				August, 1931	
						9	16	23	30	6	13	20	27	4	11	18	25	1	8
Algeria:																			
Algiers	C	2	1	1													2		
	D			1															
Bone	C	1								1									
Constantine, vicinity of	C	1	1																
	D	1																	
Philippeville	C																		1
	D																		1
Argentina:																			
Cordoba Province	C	1	2																
Entre Rios Province—Diamante	C		2																
Jujuy Province—Palpala	C	1	1																
San Juan Province	C														P	P			
Santa Fe	C		2																
Belgian Congo	C			2							1								
	D			2							1								

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended—													
						May, 1931				June, 1931				July, 1931				August, 1931	
						9	16	23	30	6	13	20	27	4	11	18	25	1	8
British East Africa (see also table below):																			
Tanganyika	C		22	8	18	17	5	7	17	4	7	5							
	D		4	1	21	11	2	8	9	2	4	1							
Uganda	C	25	15	10	35	11	33	31	63		91	106							
	D	24	15	10	32	11	26	28	61		87	100							
Ceylon: Colombo	C	8	11	8	4	1	1		1		1		1				1		
	D	6	13	7	3	1	1		1		1		1				1		
Plague infected rats		2	3	4	1			5										1	
China: Amoy [1]	C					1													
	D					1													
Dutch East Indies:																			
Batavia and West Java	C	180	141	84	74	18	12	14	15	15	25	11							
	D	168	128	80	71	18	12	14	15	15	25	11							
East Java and Madura	C	4	1	4	1	1													
	D	4	1	4	1	1													
Java and Madura	D	427	376	277	243	47	41	46	42	41	58	48	45						
Egypt:																			
Alexandria	C	1	2	1								3	1	1	1	2	9	4	3
	D											3	1	1			4	1	2
Plague-infected rats		1	1																
Assiout	C	26	41	13	32	4	5	8	1	4		5	2						
	D	6	11	6	17	2	4	1					1						
Beni-Suef	C	1			12	3		2											
	D	1			3	1		2											
Cairo	C			1															
Dakahlia	C															1			2
Deirout	C	21	16		3	7	1		2	3									
	D	4	4		1	2	2			1									
Gharbieh	C	1									1								
	D	1									1								
Girga	C	1		86	44	1	1		5					1					
	D	1		24	22	1	1												
Kena	C			5	3			1											
	D			2	1			1											

Manfalut	C	30	15	17															
	D	6	5	3															
Minieh	C	2		3	1	5		1		3				10		2			
	D	1		2		2		1		1				2		1	1		
Port Said	C										1	1	1	1	1	2	1		
	D							1				1	1	1					
Hawaii Territory:																			
Hawaii—Hamakua—Plague-infected rats								1											
Maui	C																	1	
	D																	1	
India	C	5, 335	5, 457	9, 130	6, 142	434	139	130	49	30									
	D	3, 422	3, 661	7, 037	5, 190	385	143	131	33	25									
Bassein	C	4	1		1			1						1					
	D	3	1		1			1						1					
Bombay	C	1	1	4	11	5	1	1	1					1					
	D	1	1	3	11	4	1	1											
Plague-infected rats		34	32	70	137	26	30	17	21	10	10	10	7	11	16				
Calcutta	C				2														
	D				2														
Madras Presidency	C	312	74	23	3	1	1				1								
	D	182	46	21	2		1				1								
Rangoon	C	2		1	1	1			1		1					2			
	D	1		1	1	1			1		1					1			
Plague-infected rats		4	8	7	4	1	1	3	2		3			1	2				
Indo-China (see also table below): Pnompenh	C	7	1							1		1							
	D	7	4	6	4					1		1							
Iraq:																			
Baghdad	C	5	3	8	23	7	10	4	2	10	6	1	6	1	1				
	D	4	2	5	8	3	4	2		1	4	1	3	1					
Maudhan	C								2										
Madagascar (see also table below): Tamatave	C	9																	1
Morocco	C	13																	
	D	4																	
Nigeria: Lagos	C	1			5														
	D	1			5														
Plague-infected rats					6														
Peru (see table below).																			
Senegal (see table below).																			
Siam	C	4	18	31	1	1			1	1									
	D	2	14	7	1	1			1	1									
Bangkok	C	8	6	29															
	D	8	5	6															
Nagara Rajsima	C	9	7	1															
	D	10	6																
Syria: Beirut	C	1	1												1				
Tripolitania	C	8	1																
	D	3																	
Tunisia: Tunis	C	1	14	10	16	7		8	1		8	2	1						
	D		7	4	8	3					1								

[1] On July 23, 1931, an indirect report was received stating that an epidemic of plague had occurred in Chiobe and Changchow, China, not far from Amoy.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8
Union of Socialist Soviet Republics:																			
Gouranduz	D	28																	
Transcaucasia—Karabakh	C	6																	
Union of South Africa:																			
Cape Province	C				3														
Orange Free State	C	P	1	6	2			1	1										
	D		1	1	3				2										

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
British East Africa (see also table above):							
Kenya	C	69	21	7	345	245	154
Indo-China (see also table above)	C			4	2		2
Madagascar (see also table above):							
Ambositra Province	C	100	92	70	30		
	D	96	88	66	29		
Antsirabe Province	C	66	64	83	48		
	D	57	70	74	47		
Miarinarivo Province	C	28	31	10	6		
	D	26	29	19	6		
Moramanga Province	C	7	7	1			
	D	5	7	1			
Tananarive Province	C	92	145	90	41		
	D	89	139	81	40		

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
Peru	C	29	12				
	D	8	6				
Senegal:							
Baol [1]	C					4	
	D					3	
Dakar [1]	C				2	63	64
	D				1	49	56
Louga [1]	C			14	1	5	
	D			6		2	
Rufisque [1]	C		2			1	2
Thies [1]	C						12
	D						3
Tivaouane [1]	C				4	19	3
	D					11	2

SMALLPOX

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931			May, 1931					June, 1931				July, 1931		
					11	18	25	2	9	16	23	30	6	13	20	27	4	11	18
Algeria:																			
Algiers	C	1	1	2		2					1			7	1				1
Bone	C	1																	
Constantine	C			1					1								1		
Arabia: Aden	C	1	1																
Belgian Congo	C	50								7	10	30							
Belgium	C		1																
Bolivia.[2]																			
Brazil: Porto Alegre (alastrim)	C	3	7	49	20	19	8	6	2	4	7	6	2	3					
	D		1	1									1						
British East Africa: Tanganyika	C	70	91	8						13					1				
	D	5	13	3															
British South Africa: Southern Rhodesia	C	13												1					
Canada:																			
Alberta	C	7	1																
British Columbia	C	2	8																
Manitoba	C	1	1						4										
Winnipeg	C		1																
Nova Scotia	C	1		1															
Ontario	C	49	29	9	4		6	7	17	5		3		4	3	14	3	6	
Kingston	C	1	1				2	3											
North Bay	C		1																
Ottawa	C	3	1												1				
Sault Ste. Marie	C	30	2		3	1				1									
Toronto	C			2		4			1						1				
Quebec	C	2															1		
Saskatchewan	C	38	63	58	5	16	3	22	7	15	18	8	7	16	18	13		13	
Regina	C		1	2			2		2										
Canary Islands: Las Palmas	C			1															
Chile:																			
Antofagasta	C																1		
Chanaral	C											1							

[1] Reports incomplete.
[2] An epidemic of smallpox was reported on May 13 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	April, 1931: 18	April, 1931: 25	May, 1931: 2	May, 1931: 9	May, 1931: 16	May, 1931: 23	May, 1931: 30	June, 1931: 6	June, 1931: 13	June, 1931: 20	June, 1931: 27	July, 1931: 4	July, 1931: 11	July, 1931: 18
China:																			
Amoy	C			1				2	2	1	1	2	1	2		1	1	1	
	D			1				1	1		1	1	1	1		1	1	1	
Canton	C		3	7	1	2	1				1	2			1		1		
Foochow	C	P	P	P	P			P				P		P					
Hong Kong	C	1	9	2		1	2					1							
	D		8	2			1		1			1							
Manchuria—																			
Harbin	C	1	4	2					1	1		1							
Kwantung—Dairen	C			2			1	1	1			1	1						
Nanking	C	P	P	P	P	P	P	P	P	P	P								
Shanghai—																			
Foreigners only	C	12	16	6	2	1	2	2	1	4	1	1	2	6	2	1	2	1	
Including natives	D	13	14	10	2	7	4	5	1		3	3	1	5	4	3	2		2
Swatow	D	7	13	26	2														
Tientsin	C	1							2										
Chosen (see table below).																			
Colombia: Cali	D								1										
Dutch East Indies:																			
Batavia and West Java	C	29	2	1						1	1								
	D	2	1																
East Java and Madura	C											1							
Finland	C					1													
France (see table below).																			
Great Britain:																			
England and Wales	C	958	745	795	177	163	212	192	186	166	111	107	83	94	62	48	56	45	
Bradford	C	4	1	2	1		1	4	1	3	1	3			5				
Leeds	C			1		1	1		1		1								
London	C	140	98	147	51	39	84	53	66	44	37	36	25	50	31	16	21	9	12
London and Great Towns	C	693	683	544	142	126	162	128	139	108	84	72	57	84	49	38	53	33	
	D		1		1		1						1						
Sheffield	C	3	32	10	4	2	1												
Stoke-on-Trent	C	1	1																
Greece (see table below).																			

Honduras:																			
Amapala	C		1																
Ocotopeque and Gracias districts	C		P																
Puerto Castilla	C	11	3																
Tegucigalpa	C						1												
Tela	C				1														
India	C	9,623	12,222	11,791	3,980	3,749	3,468	3,068	3,422	2,836	2,477	2,668	2,170						
	D	2,245	2,660	2,261	807	684	680	752	709	572	538	530	405						
Bassein	C											1							
Bombay	C	7	6	10	2	2	1	3	3		6	1		2	1	3		1	3
	D	1	3	4	1			4	1	1	1	1		1	1	3		1	3
Calcutta	C	143	251	283	101	60	61	65	24	30	19	16	14	19	14		11	6	2
	D	100	188	203	78	42	50	54	18	25	17	15	12	18	11		9	4	3
Cochin	C	29	59	46	10	11	12	6	3										
	D		3																
Karachi	C	3	4	4		5		1							2				
	D	2		2											1				
Madras	C	16	8	22	12	4	1	2	1	3	3	1			1	1		2	
	D		1	3	2	1	1	1		1	5					1			
Moulmein	C	2																	
Negapatam	C				1	1		1							2	1			
Rangoon	C		4	3	2	2	1	6	7	5		1		1	4	1	2		1
	D			1				1	2	1	1	1		1		1	1		
Vizagapatam	C	1	8	2	2	2	4	2			5	1	2	1		3	2		2
	D		2	1	1		1				1			1		1	1		
India (French):																			
Chandernagor	C	9	12	14	3	1	4	2	3		4				1				
	D	1	1	2	3	1	2	1	3		2								
Karikal	C	5	19	3		1	1	2	1	1	1	1	1	2		3	1	1	
	D	4	18			1		2	1	1	1	1	1	2		3	1	1	
Pondicherry Province	C	45	19	14	3			3	1	2	7	1	3	2	1	1	4	1	
	D	45	19	14	3	3		3	1	2	7	1	3	2	1	1	4	1	
India (Portuguese)	C	5	14	8		19	2				3								
	D		3	3		4	2				1								
Indo-China (see also table below):																			
Pnompenh	C	1		1							1		2						
	D	1									1								
Saigon and Cholon	C	6	4	8	1					1		1					1		
	D	4	1	8	1					1							1		
Iraq:																			
Baghdad	C		9				1	1			1	2		1					
	D											2							
Basra	C											2		1					
Mosul Liwa	C	3	5																1
	D		1																
Ivory Coast (see table below).																			
Japan:																			
Kobe	C		2																
Taiwan	C	1																	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931			May, 1931					June, 1931				July, 1931		
					11	18	25	2	9	16	23	30	6	13	20	27	4	11	18
Mexico (see also table below):																			
Jalisco (State)—Guadalajara	D	1		1				1	1		1			1			1	1	
Mexico City and surrounding territory	C		23	33	17	9	11	6	4	10	10	21	5	4	16				
	D	1	8	22	4	6	4		4	3	2	2	4	3	6				
Monterrey	C												1						
Torreon	C					1				1					1	2			
	D					2									1	1			
Vera Cruz	C		3	2		1		1	1										
Morocco (see table below).																			
Nigeria: Lagos	C			2															
Panama Canal Zone	C	2																	
Poland	C		1									3	1	1		1			
Portugal: Lisbon	C	103	40	52	8	18	11	19	19	14	16	18	5	17	12	11	15		18
Rumania (see table below).																			
Siam	C	4	2				1				3	3			4	1			
	D											1				1			
Spain	C	P	P	P														5	
Straits Settlements	C	7	2	4	1		9												
	D	1	1	1	1	1	3												
Sudan (Anglo-Egyptian)	C	11	97	8				3		3		1							
	D	7	10	2								1							
Sudan (French) (see table below).																			
Syria (see table below).																			
Tunisia: Tunis	C	8		4															
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P		P	P									
Orange Free State	C	P	P	P	P	P	P		P	P	P	P	P	P					
Transvaal	C	P	P	P															
Upper Volta	C		18	3		3			1	2		85	11		1				
	D			1								1							

On vessel:																			
S. S. Clan Mactoggart at Suez	C		2																
S. S. Matheran at Suez from Calcutta	C	1																	
S. S. Clan Buchanan at Suez	C		2																
S. S. Rotterdam at Naples from Venice	C			1															
S. S. Clan McTavish at Manila from Chittagong	C					1													
S. S. Benvenue at Sydney from Shanghai	C	1																	
S. S. Clan MacBrayne at Cochin	C		1																
S. S. Chilka at Rangoon	C		1																
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C							1											
S. S. Talodi at Suakin	C									1									

Place		December, 1930	January, 1931	February, 1931			March, 1931			April, 1931			May, 1931			June, 1931	
				1-10	11-20	21-28	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	61	141	95	46	27	125		139	100	42			17	41	30	16
Ivory Coast	C	9															
Sudan (French)	C	139					4		P								
	D	20															
Syria: Beirut	C		1														1

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen	C		1		11		1
	D		1		3		
France	C		4	10	15		
Greece	C	4		4			3
Mexico (see also table above)	D	1		3		1	1

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Morocco	C	25		4	6	7	49
Rumania	C				1		1
Turkey	C	116	63	37	1		9
	D	9	7	6			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	April 18	April 25	May, 1931: 2	May 9	May 16	May 23	May 30	June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11	July 18
Algeria:																			
Algiers	C		2	3			2	1	3		1	3	4	4		1			1
Constantine Department	C	31	4	3	2		6	1	8	3	5	6	6	3	1	16	2		1
Oran	C	3	1				1					2	2						
Australia, Western	C			1					1										
Bulgaria	C	13	5	9		26	4			5	8	3	11	10	6	3			
	D			2		3				1		3	2	1	1	2			
Chile: Valparaiso	D		1																
China:																			
Canton	C	2		1															
Manchuria—Harbin	C	3	5	3			8								1	2			
Shanghai	C	2																	
Tientsin	C				1	1													
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C					1								1	1		1		
Beheira Province	C				3	1													
	D				2														
Cairo	C	1																	
Port Said	C	1																	
Eritrea: Asmara	C			1															
Great Britain: Scotland	C	1																	
Fife County	C											1							
Glasgow	C	2																	
	D	1																	
Greece (see table below).																			
Guatemala.[1]																			
Iraq: Baghdad	C		5	2					2										
	D		1						2										
Irish Free State:																			
Cork County—																			
Schull	C																	1	
Skibbereen	C													1		1	1		
Kerry County—																			
Dingle	C								1										
Listowel	C															1			

Place																			
Limerick County—																			
Limerick	C																2		
Michelstown	C																1		
Mayo County—Belmullet	C					1													
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico (see also table below).																			
Durango	D	1																	
Mexico City, including municipalities in Federal District	C	39	35	216	67	34	38	31	16	27	17	15	7	12	27				
	D	34	16	84	18	7	17	14	9	7	7	10	4	4	11				
San Luis Potosi	D		5	5	1	2					1	1						1	8
Morocco	C	8	28	7		1		12		13	29			31	42	28	37	20	24
	D	2	1					1		2	2			2	3	1	4	4	
Palestine	C	2	3	5	1	2		2	2	1	1			2	3		2		
Panama Canal Zone—Balboa	C									1	1								
Paraguay: Asuncion	D	4	1	1															
Poland	C	106	189	287	93	176	140	129	92	81	58	67		48	33	16	9	17	13
	D	8	19	15	8	7	6	7	6	4	5	3		2	1	1	2	1	1
Portugal: Oporto	C	1																	
Rumania	C	193	152	214	70				63	52	54		42	16	12	10	2	2	7
	D	16	24	16	8				10	5	3		4	7	2		2	2	1
Syria	C									1	3								
Tunisia:																			
Sbeitla, vicinity of	C			20	2			10											
	D			7															
Sfax	C			2															
Tunis	C	16	18	14	2		1	10	12	9	8			64	9		1		
	D								1	2				4					
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	1	P	P	P		P	P	P	P	P	P					
Municipality of East London	C	3		P											1				
Natal	C	P	P	1	P	P	P	P	P		P	P	P	P					
Orange Free State	C	P	P	P	P	P	P			P	P	P	P	P					
Transvaal	C	P	P	P	P	P	P		P	P	P	P	P						
Yugoslavia (see table below).																			

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen: Seoul	C	1	1		3	4	
Czechoslovakia	C	24	60	26		5	
Greece	C	10	10	17	8	22	6
	D		2	2	1	3	
Latvia	C			12			
Lithuania	C	6	26	3	99	34	10
	D	3	3	1	3	5	
Mexico (see also table above)	D	85	66	83			
Turkey	C	2	17	18	15		3
Yugoslavia	C	1	20	12	10	43	14
	D	1	2		1	5	

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reported an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended													
						May, 1931				June, 1931				July, 1931				Aug., 1931	
						9	16	23	30	6	13	20	27	4	11	18	25	1	8
Brazil:																			
Bahia State	C			1															
Ceara State	C	1		2	2		1			1									
	D	1			2		1												
Minas Geraes State	C			2	5	1		1											
	D			1	2	1													
Rio de Janeiro State	C		1	2			1	1											
	D		1	2															
Cambucy	C	3	2	1															
	D	3	1																
Friburgo (imported)	C	1																	
Padua	C	2	1																
	D	2																	
Sergipe State	C										1								
British Cameroons: Mamfe	C						3			1		1							
	D						2												
Colombia: Magdalena Prov.—near Cienaga	C															4			
Gold Coast:																			
Akuse	C													2					
	D													1					
Kintampo	C															1			
	D															1			
Tam	C														2				
	D														2				
Wale Wale	C																	1	
	D																	1	
Ivory Coast:																			
Bobo Dioulasso	C														1				
Grand Bassam	C																	2	
Kong Circle	C															4			
Nigeria: Abakaliki	C																		1
	D																		1
Sudan (French)	C															4			
Upper Volta: Banfora	C																2		

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

VOL. 46 AUGUST 28, 1931 NO. 35

THE MEDICAL PROFESSION AND THE HEALTH DEPARTMENT[1]

By A. J. McLaughlin, *Medical Director, United States Public Health Service*

I. ACHIEVEMENTS OF PHYSICIANS IN PUBLIC HEALTH DEVELOPMENT

The rôle which physicians have played in the evolution and development of our present-day practice of public health is one of which the profession may well be proud.

Almost without exception the men who have brought order out of chaos and who have developed the health departments to their present state of efficiency have been physicians. Pasteur was a chemist, and many research workers who discovered facts in preventive medicine were not physicians, but it was the physician acting as health officer who applied this knowledge and developed the system of wholesale preventive medicine which is the main objective of health departments. But this was all individual effort, and no significant collective action in preventive medicine by organized medical societies was in evidence until the decade beginning about 1920. This was not the fault of the practicing physician. He had been taught curative medicine only—to care for the sick and injured—and only within the decade mentioned has preventive medicine been taught in an effective manner to undergraduate students of medicine. The development of preventive medicine in health departments since 1900 has been rapid, through the vigorous efforts of health officers. Even more enthusiastically unofficial agencies, by educational propaganda, have insisted on prevention and the development of facilities for prevention rather than cure.

The medical profession, holding to its primary business of curing the sick and treating the injured, steadfastly refused to establish clinics for the examination of apparently healthy people or to immunize or vaccinate against disease except upon individual request. It was natural, therefore, that both official and unofficial health agencies, in their enthusiasm, and in the absence of such facilities, should establish clinics and create in the public mind by education a demand for protection against contagious diseases by vaccination

[1] Presented at the annual meeting of the Illinois State Medical Society, at East St. Louis, Ill., May 6, 1931.

or immunization and for the discovery and early correction of disease and defects. Unofficial agencies were able to secure large sums of money for such preventive work; the great foundations allotted large funds for preventive work, educational and otherwise, and the official health officers secured for their departments large appropriations to prevent diphtheria, typhoid fever, tuberculosis, and, later, venereal diseases. As a result an artificial gulf developed between the physician who was a health officer and practiced preventive medicine and the physician in private practice who practiced curative medicine.

In certain diseases where treatment is necessarily a part of prevention, the doctor in private practice saw clinics develop and expand which seemed to be taking his patients away from him. This gulf should never have been created and, fortunately, is now disappearing. The undergraduates in Class A medical schools are now taught preventive medicine; and the majority of physicians in practice who had no such instruction are willing to concede that preventive medicine is part of their job. They now practice preventive medicine in individual cases but are slow to organize and establish the facilities (clinics), necessary to do the work on a large scale.

Forty years of evolution and development in public-health work has brought public-health administrators to the point where at last they know what ought to be done and the best way to do it. In those 40 years, and especially in the period since 1900, they have established both fixed and traveling clinics and have conducted wholesale immunization campaigns and wholesale examination for the discovery of defects in school children—all of which is work that should be done by the practicing physician and by the medical society as a collective unit. The only excuse for invasion of the physician's territory was that the physician individually and collectively would not do these things that were urgently necessary if we were to accomplish anything in preventive medicine. No health officer could sit idly by while children died, incipient tuberculosis became advanced tuberculosis, and venereal disease ran rampant, when agressive action, even if wrong in principle as an invasion of the private physician's field, could prevent this unnecessary loss of life.

Public-health practice is not yet standardized, but three decades of experience has taught us much. It is no longer in a state of flux. Our ideas of prevention have crystallized. Health officers now know what ought to be done and what part organized medicine should play in the drama of preventive medicine. Even with the tremendous development in public-health activity, including the clinics, immunization campaigns, drives for early discovery and correction of defects, educational propaganda and prenatal clinics for mothers, and baby-welfare stations, certain fundamental defects exist in our public-

health programs which can be corrected only by concerted effort of county medical societies or by State medicine or some system similar to State medicine.

II. PUBLIC HEALTH DEFECTS WHICH CAN BE PROPERLY CORRECTED ONLY BY THE COLLECTIVE ACTION OF ORGANIZED COUNTY MEDICAL SOCIETIES

(a) MATERNITY AND INFANCY

While the work of health departments and unofficial agencies with educational propaganda and by clinics has greatly reduced the infant mortality, the death rates for mothers in childbirth or soon after and for children under 1 month of age remain high. They are so high that they place the United States near the bottom of the list of civilized nations and really constitute a national disgrace. Money expended under such provisions as the Sheppard-Towner Act can not alone have the desired effect upon this high death rate. The condition is due principally to our lack of proper prenatal and obstetric care by physicians who have not had sufficient experience before graduation, who have no lying-in hospital available, and to the enormous number of ignorant and untrained or partially trained midwives. It is not the midwives alone who are to blame. There are too many busy general practitioners who do obstetric work who have not had the necessary undergraduate training and experience, and who lack the advantage of expert consultant advice that could be made available in a lying-in hospital and clinic established and supervised by the county medical society.

(b) THE PRESCHOOL CHILD

The greatest single defect in our public-health work to-day is our inability to secure early immunization and early discovery and correction of defects in children from 1 to 5 years old. In this field health officers have barely scratched the surface. We begin to get control of children only in the school-age group, when five years have already been lost. Strenuous efforts have been made through baby-welfare stations, parent-teacher associations, and the splendid missionary work of public-health nurses, but the fact remains that, generally speaking, this field is almost untilled. The only way in which early immunization and early discovery and correction of defects can be secured is by the action of the practicing physicians individually and collectively. Official action can not reach this group.

(c) PREVENTIVE MEDICINE FOR THE ADOLESCENT AND ADULT

Most certainly we need more general practitioners, but we need general practitioners who have knowledge of the modern technique and equipment necessary for early diagnosis in the ambulant stage.

It is too much to expect that they should have this equipment in their individual offices; but the equipment and apparatus should be readily available, within easy reach and freely used. Too often we find plain symptoms of gastric or duodenal ulcer treated for months by prescription for indigestion; incipient tuberculosis treated by prescription for months without diagnosis until it becomes moderately or far advanced; pathologic conditions of gall bladder or appendix without a Graham test or X ray treated for months by prescription until some acute climax forces operation or causes sudden death; hyperthyroidism and hypothyroidism receiving perfunctory office treatment by prescription without basal metabolism tests; treatment of female genital complaints by tampons or by guess-work surgery without X ray after the use of dyes and many other conditions which receive office treatment without the use of modern diagnostic methods.

In the large cities and medical centers the diagnostic equipment is available and more likely to be used, and the general practitioner of 50 or more years of age is likely to have kept pace with the advances in diagnostic technique. In the small cities and towns and in the large rural areas, where the average age of physicians is 52 years, it is quite another story. If a man or woman not acutely ill asks for examination or treatment, the examination is perfunctory and incomplete. The campaign and propaganda for annual physical examinations of the apparently healthy fell far short of its possibilities, because in cities the examination costs too much or the applicant feared an unknown cost, while in the small cities and towns and rural areas the facilities for complete examination did not exist.

III. FACTORS IN THE FAILURE OF ORGANIZED MEDICINE TO CORRECT THESE DEFECTS

(a) LACK OF ORGANIZATION

We speak of the organized medical profession, but its organization is little more than provision for periodic meetings for the reading and discussion of papers on scientific subjects. An exaggerated sense of ethics makes many physicians shrink from anything like business organization; yet organization on a business basis, provision of clinic facilities, regulation of fees on a sliding-scale basis according to income are essential if State medicine is to be prevented. There are notable exceptions, for instance, the medical society of Kings County (Brooklyn), the New York Academy of Medicine, and the Wayne County (Detroit) Medical Society have taken steps toward business organization with a view toward social service; but, except these and a few others in large cities, county medical societies are unorganized except for periodic meetings for the presentation and discussion of

scientific papers. The business side of their real obligation, to establish facilities for the best preventive medical and surgical advice and treatment at a price that each citizen can afford, is entirely neglected.

(b) COST OF MEDICAL CARE

There has been a lot of loose talk and inaccurate statements in regard to the cost of medical care. The best modern medical care is worth all that you pay for it, provided you can afford the cost. The cost has not increased out of proportion to the increased cost of other services. Medical care, especially early diagnostic procedures and treatment, has been expanded and amplified by the discovery of more precise methods of diagnosis and has become exceedingly complex. This necessarily increases the cost of examination as compared with that of 40 years ago, when the physician used only his own senses and perhaps a stethoscope.

In the large cities the facilities for early diagnosis and for the best preventive medical and surgical care are available. The trouble here is that the man of moderate means does not know what it will cost; and fearing that the cost will be excessive, he avoids the doctor and the clinic and neglects himself and his family until serious illness or injury forces him to call a doctor. In the small cities, towns, and rural areas lack of proper early preventive treatment is not due to the cost, but is due to the fact that the facilities for early diagnosis and treatment do not exist. I have seen many small cities with a small modern hospital approved by the American College of Surgeons but without an out-patient department. What does this mean? There is no provision for preventive medicine; a man must be knocked down by an automobile, have typhoid fever or pneumonia, in other words, be seriously injured or acutely ill before he comes in contact with the modern equipment of such a hospital. There must be a decentralization of modern equipment from the large cities and medical centers to the small cities and towns, and also a better distribution of young physicians who know how to use this equipment.

(c) DISTRIBUTION OF DOCTORS

While the problem in large cities is principally one of organization and adjustment of modern facilities which already exist, the problem in the small city, town, and rural area is the necessity for these facilities which do not now exist. Next to the need for out-patient facilities and modernly equipped clinics, the greatest need is for more and better trained physicians. One-third of the towns of 1,000 population or less in 1925 had no physician. In 1906 there were 33,000 physicians in such small towns; in 1924 there were 27,000—a decrease of 18 per cent. The average age of these physicians in 1925 was 52 years. When

they were graduated preventive medicine was not taught nor was it considered a part of a practicing physician's work. Present day methods of precision in diagnostic technique and modern equipment were unknown.

It is possible that physicians in this age group in the large cities have kept pace with advances in methods and apparatus for modern practice; but in the small city, town, or rural area it is extremely unlikely that physicians over 50 have kept up, and even if they have a reading knowledge of such methods and equipment, the facilities are not available.

The young medical graduate of a class A school to-day is trained in preventive medicine and is taught to use the modern instruments of precision in diagnosis. He learns to depend upon the modern facilities which are used in his college and hospital training. These are available in the city, and, hence, he stays in the large city. He will not go to the small town because these facilities do not exist and he can not practice medicine in the way he has been taught. Here again the remedy is obvious—there must be decentralization of modern diagnostic and treatment facilities from the large cities and medical centers to the small city.

In the distribution of young, highly trained graduates, the law of supply and demand is inoperative. Why? The reasons given above explain. The young physician would go to the small city or town where the demand for his services is greater, and the remuneration also greater, rather than practice in the keen competition of the city overcrowded with physicians, provided he could practice medicine in the modern way with modern facilities, which he considers indispensable.

IV. REMEDIES SUGGESTED FOR CORRECTION OF THESE DEFECTS

(a) ORGANIZATION OF COUNTY MEDICAL SOCIETIES AND DECENTRALIZATION OF MODERN METHODS, TECHNIQUE, AND EQUIPMENT FOR EARLY DIAGNOSIS AND TREATMENT

It is not sufficient to have all facilities for the best preventive medical and surgical diagnosis, advice, and treatment available in the large city or medical centers of a State. The citizens living in small cities, in towns, or rural areas are, in common justice, entitled to the use of such facilities quite as much as the wealthy or the poor living in the large city or medical center. The county medical society should establish or cause to be established in the county seat and, in populous counties, in other small cities out-patient clinics completely equipped for early diagnosis and treatment. They should fix the fees on a sliding scale according to income—for example, dividing the clientele into three or more classes, as follows:

(1) The indigent to be paid for by the county at a fixed rate.

(2) Those earning less than $1,500 per annum to pay a minimum fee.

(3) Those earning from $1,600 to $2,400 per annum to pay a higher fee.

(4) Those earning over $2,400 per annum to pay full fees.

The fees for house or office visits should be determined for these same classes. The facilities for diagnosis or treatment of the out-patient clinic or hospital should be available for all members of the medical society and the fees collected divided pro rata.

(*b*) STATE MEDICINE

The term "State medicine" is used here because it commonly signifies the bogey that continually confronts the practicing physician. State medicine means the assumption by the Government (Federal, State, or municipal) of the obligation to give every citizen or group of citizens medical and surgical care by physicians who receive no fees but are paid a salary by the Government. In general, this would mean the State government, but the same results to the practicing physician are possible by the encroachments of private corporations which assume this obligation for their employees, using salaried physicians to do the work.

The advocates of State medicine have claimed that the defects noted above in our public-health activity would be corrected by State medicine, because medical and surgical and, presumably, preventive advice and treatment would be available to all citizens without cost. One must admit that, theoretically, under such a system treatment would be available to all, but what kind of treatment? If a crowded office in which the panel doctor gives a prescription, rushes one patient out, and, like a barber, calls "Next," can satisfy the needs of scientific medicine, then the system might suffice. But to-day the average American citizen knows that he is entitled to better treatment than this. He has been educated to the point where he knows something of the newer methods and equipment used in modern diagnostics and treatment.

To me State medicine appears as a miserable makeshift. It is un-American, ultrapaternalistic, and destructive of self-respect in both doctor and patient. It is a failure in Germany, in England, and in other European countries. It is, from an American viewpoint, a pauperizing influence, wrong in principle and doomed to failure in practice if we should ever be foolish enough to try it.

In presenting this paper there were in mind two objectives: The first concerns the practicing physician; the second concerns public health administration. I should like to see the medical profession solve its own problem in its own way without outside interference by governmental or any other agency. Proper organization of county medical societies will make State medicine impossible, enable the physician to retain his self-respect, and preserve that priceless, intimate,

confidential relation that should exist between physician and patient. In regard to the second objective, more efficient public health administration, this same organization of county medical societies would also correct the defects in our public health activity cited above. It will make possible better lying-in facilities and better consultant advice for prenatal work. It will provide the machinery now lacking for early diagnosis and treatment of diseases or defects in the preschool child and in adolescents and adults as well.

REPORT ON SOME TESTS OF THE USE OF A NEW CYANOGEN PRODUCT IN SHIP FUMIGATION

By C. L. Williams, *Surgeon, United States Public Health Service*

BRIEF HISTORY OF DEVELOPMENT

For some time the American Cyanamid Co., of New York, has been endeavoring to develop a practical means of measuring small doses of "solid type" cyanide products for use in fumigating superstructure compartments on ships. The New York Quarantine Station has cooperated with representatives of this company by suggesting possible lines of development and by testing containers and material. The selection of a porous material seems undoubtedly influenced by the growing popularity of Zyklon, and with the HCN discoids the difficulty of measuring small doses required for use in fumigating small compartments has apparently been overcome. This has been done by developing a product, representing HCN in a solid form, in units, each unit carrying a definite and relatively small amount of the fumigant.

Experimental "HCN Discoids" were furnished to the New York Quarantine Station early in 1930 with the request that they be tested to determine whether they constituted an effective and practical fumigating material. Various disadvantages, appearing in the first lot of discoids, have been obviated, and the discoids at present supplied embody improvements, some of which originated with the company and some of which have been suggested by the New York Quarantine Station.

THE PRODUCT

"HCN Discoids" as at present supplied to this station consist of wood pulp disks 3⅝ inches in diameter and three thirty-seconds of an inch thick. They are very porous and obviously highly absorptive. The dried out disks when dipped in water soak up the water in a manner similar to that observed with blotting paper. The material, however, is coarser and stiffer than blotting paper. It is light yellow in color. It is claimed that these discoids are capable of absorbing

two and a half times their weight of liquid HCN. When shaken from a recently opened can they have a wet appearance and are damp and cold to the touch. About one hundred 1-pound cans have been opened during our tests, and in none of these was found any free liquid.

"HCN Discoids" are at present supplied in cans about 8 by 4 inches, each holding approximately 64 individual discoids in which is absorbed 1 pound of liquid HCN, containing, in addition, 5 per cent (by weight) of chloropicrin. It is understood that manufacturing specifications require that the number of discoids held be between 61 and 67, but in the material furnished us actual numbers have exceeded these limits, the extremes being 60 and 76. This, however, is a manufacturing problem which should be easily solved. It is designed that each discoid should hold approximately ¼ of an ounce of HCN.

The cans are made of relatively heavy material and have the appearance of being strongly constructed. They are labeled "HCN Discoids," the label carrying the usual poison warnings, various directions, and the statement "Contents, 16 ozs. hydrocyanic acid net."

To open the cans a special type of can opener is required which cuts out the top close to the rim and leaves a clean, smooth edge. The discoids, being slightly smaller than the diameter of the can, shake out easily.

The 1-pound cans are packed 48 to the case. Each can is protected by a heavy cardboard cap fitting over either end. These cardboard caps are sufficiently close fitting to be used as temporary covers after opening the cans.

It is understood that another size of can will be put on the market, each containing 40 ounces of HCN. In these the discoids will be 5⅛ inches in diameter and three thirty-seconds of an inch thick. They will be packed approximately 80 discoids to the can, each containing approximately one-half ounce of HCN.

METHOD OF USE

The can opener supplied is extremely efficient. With it half a dozen or more cans a minute may be opened. It is possible either to take the can opener to the locations where the discoids are to be applied or to open all cans required at one spot, cover the open ends with the cardboard caps, and then take them to points of use.

From the open cans the discoids are shaken out either into the hand or onto the floor. If shaken into the bare hand, the chilling and numbing effect of HCN is experienced; but this can be almost entirely eliminated by even such slight protection as lightly paraffined cotton gloves.

In the superstructure compartments it is necessary to scatter the discoids on paper, otherwise slight staining of carpets or other floor covering is experienced, similar to that caused by Zyklon. In the holds, however, they can be scattered directly on the bottom or deck. In the superstructure some care is necessary to prevent the discoids from being piled on each other, but when dropped into an empty hold there appears no tendency for them to stick together, as the force of the air scatters them widely. In the holds they can be sailed from the hatch onto the " 'tween decks."

By counting out the discoids, reasonably accurate doses can be placed in small compartments.

When discoids are put into loaded holds through hatchways it is necessary to scatter them more widely than is the case with Zyklon. When dropped down ventilators on loaded ships there is more of a tendency for the greater proportion to fall into the lower hold than appears to be the case with Zyklon. This is undoubtedly due to the larger size of the units, which prevents many of them from passing into the relatively narrow outlets onto the " 'tween decks." Those that pass to the " 'tween decks" are scattered, but those that drop down the central pipe of the ventilator into the lower hold fall in a pile. Very much the same thing happens with Zyklon.

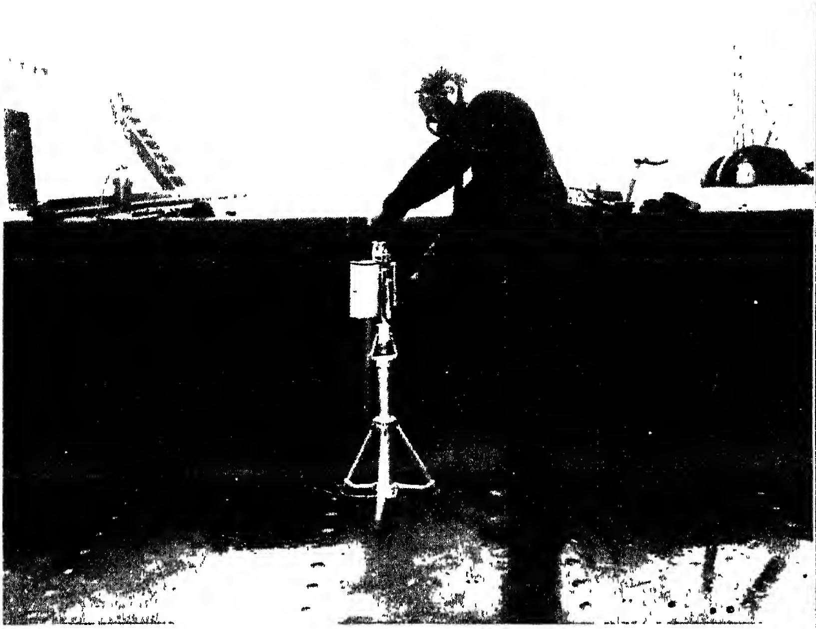
LABORATORY TESTS

Two 1-pound (net weight HCN) cans of discoids were weighed separately before being opened. The cans were then opened and the contents of one of them scattered in the open air, while the contents of the other were scattered on the floor of a room of approximately 1,000 cubic feet capacity. At intervals each lot of discoids was gathered up and weighed with its can. Following this, parallel tests were made with two 1-pound (net weight HCN) cans of Zyklon. The progressive loss of weight in each instance is shown in the following table:

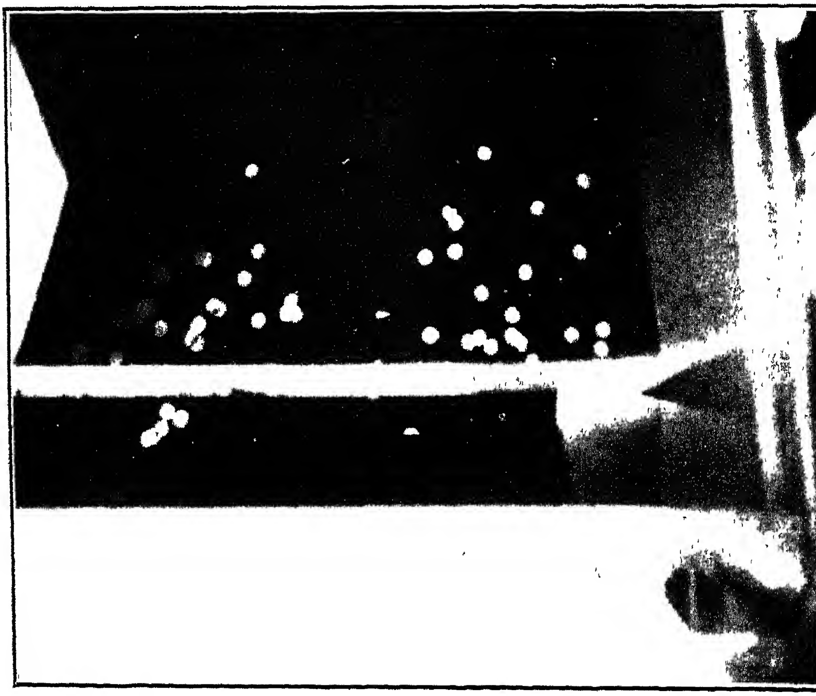
Loss of weight on exposure

Form of cyanogen and placement	Gross weight of can and contents in grams	Weight lost at end of—			
		30 minutes	45 minutes	1 hour	2 hours
		Grams	*Grams*	*Grams*	*Grams*
Discoids in room	968	195	280	388	430
Discoids in open	965	440	453	455	455
Zyklon in room	1,466	264	312	348	477
Zyklon in open	1,449	460	503	506	506

A series of rooms at Hoffman Island was fumigated with discoids, using 2, 4, 6, 8, 10, and 12 ounces of HCN per thousand cubic feet. The time of exposure was two hours, followed by airing for one hour.



Special can opener for HCN discoids. The can is put in position and the lever is pushed straight down, which brings the can up against the edge of the cutting tool, where it is held by a toothed wheel below. Turning the handle revolves the can, cutting out the top close to the rim. The can remains in position until it is released by raising the lever. The entire operation can be completed in 10 seconds



View from the deck looking down through a hatch, showing distribution of discoids from a 1-pound can scattered on the floor of a bunker. The discoids are shown as they lay after having been thrown from the can with a single sweep of the arm by a person at the hatchway on deck, about 8 feet above

The spent discoids from each room were placed in unfumigated rooms of approximately the same size, in each of which was placed a guinea pig. These rooms were then closed and the guinea pigs were observed 16 hours later. All guinea pigs were found alive. In the rooms there appeared no trace of HCN. These tests are set forth in the following table:

HCN discoids residue—effect on guinea pigs

Rooms fumigated 2 hours and aired 1 hour				Discoids placed in these unfumigated rooms each holding a guinea pig which was observed after 16 hours.		
Room No.	Capacity in cubic feet	Number of discoids used	Concentration HCN per thousand cubic feet	Placed in room No.	Capacity in cubic feet	Results after 16 hours
1	1,040	8	2	7	700	Guinea pig alive.
2	1,040	16	4	8	1,370	Do.
3	1,840	43	6	9	1,370	Do.
4	1,840	58	8	10	1,440	Do.
5	700	28	10	11	1,370	Do.
6	1,040	48	12	12	1,100	Do.

It will be noted that these tests parallel similar tests carried out by Doctor Sherrard with Zyklon residue.[1]

In these tests the discoids were examined shortly after the fumigated rooms were opened. In all cases they were found quite dry in appearance and feel. When taken into fresh air only a slight odor of HCN could be detected, although the odor of chloropicrin was distinct. After one hour of airing no odor of HCN could be detected, although a distinct odor of chloropicrin persisted. When examined the next day only a very slight odor of chloropicrin could be detected.

FUMIGATIONS ON SHIPBOARD

On shipboard two comparative fumigations were carried out in the holds. In the first of these the original thick discoids were used, while in the other the present standardized type was used. In the superstructure two comparative fumigations were also performed, one with the old type and one with the new. In addition, discoids were utilized for the fumigation of a superstructure compartment heavily infested with roaches. A number of preliminary tests were made in superstructure compartments and several informal tests in bunkers and holds which, in general, demonstrated disadvantages and indicated the changes resulting in subsequent improvement.

[1] Public Health Reports, Dec. 16, 1927. (Reprint No. 1196.)

TEST ON THE S. S. "THURLAND CASTLE"

The first comparative test in ship's holds was conducted on the S. S. *Thurland Castle* on April 25, 1930, when No. 1 hold was fumigated with liquid HCN, using the air jet sprayer, No. 2 hold with the early thick type of discoids, and the other holds with Zyklon. The engineers' quarters in the midship superstructure were fumigated on one side with Zyklon and on the other side with HCN discoids.

Before the fumigation, sampling tubes had been placed in holds 1, 2, and 5 and in both sides of the engineers' quarters. In each hold sampled, the tubes were set so as to draw air from the bottom, "'tween deck," and shelter deck, approximately in the center of the hatchway, and from the "'tween deck" close to the side of the ship.

Samples taken at the end of 30 minutes showed in hold No. 1 full concentration, that is, 2 ounces per thousand cubic feet, at all points except the shelter deck, which ran slightly lower. In hold No. 2 approximately one-half concentration, that is, 1 ounce per thousand cubic feet at all points except the "'tween deck" at the side, where it was approximately one-half ounce per thousand cubic feet. Hold No. 5 showed between 1½ and 2 ounces per thousand cubic feet in the lower hold and "'tween deck" hatch area, but only one-half ounce in the shelter deck and "'tween deck" at the side of the ship.

At the end of 75 minutes No. 1 hold showed a drop of only about one-half ounce per thousand cubic feet at all points; that is, there was still in this hold a concentration of approximately 1½ ounces per thousand cubic feet. Hold No. 2 showed an increase of concentration to 2 ounces per thousand cubic feet at the bottom; between 1 and 1½ ounces at the "'tween deck," and 1 ounce on the shelter deck. The "'tween deck" near the side of the ship showed 1½ ounces. No. 5 hold showed an increase at the bottom of the hold to 2 ounces per thousand cubic feet, and at the shelter deck to 1 ounce per thousand cubic feet; the "'tween deck" in the hatchway as well as the "'tween deck" near the side of the ship remained practically unchanged at approximately one-half ounce.

Final tests were taken 2 hours and 10 minutes after the start only in the "'tween deck" hatchway tubes. These showed in No. 1 hold 1 ounce per thousand cubic feet, in No. 2 hold 1½ ounces per thousand cubic feet, and in No. 5 hold 1½ ounces per thousand cubic feet.

The engineers' quarters at the end of 30 minutes showed on the Zyklon side one-half ounce per thousand cubic feet and on the discoid side 1 ounce per thousand cubic feet. At the end of 70 minutes on the Zyklon side concentration had increased to eight-tenths ounce, while on the discoid side it remained the same, at 1 ounce. At the end of 2 hours and 10 minutes the Zyklon side concentration had

dropped to about three-tenths ounce per thousand cubic feet, while on the discoid side it dropped to eight-tenths ounce per thousand cubic feet.

It will be seen at once that in the hold fumigated with liquid HCN a full concentration was obtained early and that this held fairly well, having dropped only 25 per cent at the end of 1¼ hours, and 50 per cent at the end of 2 hours and 10 minutes. It will also be noted that the concentration at the side under the "'tween deck" was just as high as in the hatchway. This is accounted for by the fact that the air-jet sprayer shoots the gas out under considerable force in all directions.

Compared with the liquid, both the discoids and the Zyklon developed maximum concentration more slowly and never reached the same heights in the upper levels, but retained a somewhat higher concentration at the end of two hours. As far as concentration attained is concerned, there was very little to choose between discoids and Zyklon in the holds.

In the superstructure the discoids apparently produced nearly twice the concentration reached by the Zyklon, and this was retained longer. It is believed, however, that this diversity of results may have been due to the direction of the wind, which blew *against* the side containing Zyklon and may have caused sufficient air current to keep the gas away from the sampling tube. Results in superstructures can not be predicated upon a single test.

In the superstructure the Zyklon was poured out on a piece of paper in the alleyway on one side, while the discoids were scattered on another sheet of paper in the alleyway on the other side. After airing for 10 minutes the residues were examined. The Zyklon was found quite dry throughout, but about one-quarter of the discoids were found to be still wet in appearance and feel. When brought close under the face a strong odor of HCN could be detected from them. The wet ones were in all cases the thick ones, none of them less than one-fourth inch in thickness.

The side of the superstructure in which Zyklon had been placed cleared more rapidly than did the side where the discoids had been used, but this was probably due to the wind direction.

The weather was reasonably favorable to clearing the holds, being moderately cool but not cold, with a light breeze blowing diagonally across the ship.

When the holds were opened, the odor of gas was very strong in No. 1 hold, decidedly stronger than in No. 2 or No. 5 holds. At the end of one hour gas was too strong below the shelter deck in all holds to permit a safe search for rats. At the end of one and one-half hours No. 1 hold was clear, as was also No. 5 hold. No. 2 hold was clear on the shelter and "'tween decks," but in the lower hold there was a

relatively strong tear-gas concentration and sufficient HCN to make it advisable to leave it, although probably not actually dangerous. It was obvious that the high tear-gas concentration was due to the discoids scattered over the floor of the hold. They were, therefore, gathered up, hoisted on deck, and, except for a sample taken to the laboratory, thrown overboard. They were all quite dry in appearance and feel, and when broken open did not smell of HCN, although an odor of chloropicrin was evident.

The fumigators who removed these discoids did not find it necessary to wear gas masks during the 8 to 10 minutes so employed.

All holds were found clear at the end of two hours after opening.

Some 50 or 60 discoids gathered up from the bottom of No. 2 hold were wrapped in a sack and brought back to the laboratory, being approximately 30 minutes en route. At the laboratory eight of them were put into a glass jar, capacity about 1½ cubic feet, together with two white rats, the jar then being covered with wax paper. The rats were observed for 20 minutes, during which time they showed no sign of distress. The next morning, 17 hours later, both white rats were found dead. Test papers introduced at this time showed a concentration of between one-tenth and two-tenths ounce HCN per thousand cubic feet.

The discoids are only slightly more trouble to use than is Zyklon. It is necessary to open the cans with a can opener which cuts a clean edge close to the rim, otherwise they can not be readily shaken out. In hold No. 2, however, fifteen 1-pound cans were opened and distributed in four minutes. Using 2½-pound cans, it is estimated that this could be cut to about two minutes, which compares very well with Zyklon.

The discoids have one distinct advantage over Zyklon in that the fumigators can pour them out into their hands and sail them on to the "'tween deck" from the hatch. Anyone thoroughly familiar with Zyklon fumigation knows that the general run of fumigators, unless kept under immediate surveillance, will not deposit Zyklon on the "'tween decks," because to do so generally requires that they descend into the hold. Instead, they pour it onto the bottom of the hold from the deck. This results in a thorough fumigation of the bottom of the hold, but does not produce high concentrations on the "'tween" and shelter decks.

A handful of discoids can be flipped with a motion of the wrist so that a considerable portion of them will sail on to the "'tween deck."

The discoids dropped from the can at the weather-deck hatch scattered over the bottom of the hold. There appeared to be no tendency whatever for them to stick together, and from this height they caught the air and were thoroughly separated.

This first comparative fumigation of superstructure compartments made on the S. S. *Thurland Castle* with the early thick type of discoids was inconclusive, because, while the section fumigated with discoids showed a higher concentration throughout than that fumigated with Zyklon, the latter was on the windward side of the vessel. On this occasion, when the fumigated spaces were opened, some of the discoids were found still slightly wet with HCN, while the Zyklon was quite dry.

TEST ON THE S. S. "VIRGINIA"

Another comparative fumigation was peformed with the improved thin type of discoids and Zyklon on the S. S. *Virginia*, May 13, 1930. On this occasion the forward holds were fumigated with Zyklon, while the after holds were fumigated with discoids. This vessel is a small one and in reality contains only two holds, one forward and one aft, although for the forward hold there are two hatches. There are three levels in each hold.

Inspection prior to fumigation showed a large amount of rat harborage in the form of wooden sheathing over the bulkheads and sides of the ship, placed for the purpose of keeping bananas away from the metal. There was also a considerable amount of dunnage, a number of pipe casings, and in the after hold two collections of pig-iron ballast. The ship, however, did not show signs of heavy infestation, the evidence in the after hold being very scanty, while that in the forward hold indicated the presence of probably not over 10 rats. For the entire ship an estimate of 10 to 20 rats was made. This was borne out by the recovery after fumigation of 19 rats, the majority of these in the forward hold. No rats were recovered in the after hold.

In all of the holds water was found in the bilges, while the woodwork and dunnage were decidedly damp, and the belief was expressed before fumigation was begun that much of the fumigant would be absorbed, so that the concentration would probably be low.

Prior to beginning fumigation, six sampling tubes were placed in the forward hold and an equal number in the after hold. These were placed to draw samples from all three levels, both in the hatchway and under the deck.

Zyklon in amount to produce a concentration of 2 ounces per thousand cubic feet was put into the forward hold and discoids in the same dosage into the after hold. Particular pains were taken to scatter both the Zyklon and the discoids on the " 'tween decks," as well as on the bottom of the hold.

Thirty minutes after beginning fumigation, samples were drawn from the after hold; similar samples were drawn from the forward hold 50 minutes after commencing fumigation. All of these samples showed a concentration, at all points, of approximately 1 ounce per

thousand cubic feet. Another set of samples was taken in the after hold an hour and a half after beginning fumigation and in the forward holds two hours after beginning fumigation. These samples showed a concentration at all points, except the top of the hatchway, of approximately one-half ounce per thousand cubic feet. At the top of the hatchway the concentration was about one-quarter ounce per thousand cubic feet. In the last set of samples concentration in the forward hold was apparently a little less than that in the after hold, but there was not a greater difference than could be reasonably accounted for by the longer time elapsing after beginning fumigation before the samples were taken.

After opening it required a little over one hour for both holds to clear. This was rather a long time for such a small ship (900 tons net), but was probably due to almost entire lack of breeze. As shown by test papers dropped into the holds, no difference in clearing time could be seen between the forward and after holds; but, as judged by the presence of tear gas, the forward hold cleared more rapidly than the after hold; in fact, tear gas persisted in the lower level of the after hold until the scattered discoids had been taken up and removed.

The persistence of tear gas in the hold fumigated with discoids was apparently due to the slow evaporation of the chloropicrin from the discoids. This became obvious when, on descending to the bottom of the hold, it was found that the tear gas was strong immediately under the hatchway where the discoids were scattered, but almost entirely absent in the far corners of the hold under the deck. Evidently the gas had all cleared from the corners and presumably from under the hatchway also, but under the hatchway tear gas was being constantly supplied from the discoids. That gas had been in the corners was proved by tests of samples drawn from under the deck during fumigation. The individual discoids when held under the nose smelled strongly of chloropicrin.

The discoids, when gathered up and examined, were all quite dry and gave off no discernible odor of HCN. However, a number of them were taken to the laboratory where two were placed in a jar, approximately 1½ cubic feet capacity, with a white rat, and four were placed in a similar jar with another rat. These rats showed no sign of discomfort for one-half hour, but both rats were found dead the next morning. It is a question whether they were killed by HCN or chloropicrin.

It was reported to the laboratory by a representative of the American Cyanamid Co. that they had exposed some of the same lot of discoids in amount to produce 2 ounces HCN per thousand cubic feet in a room for two hours, and then aired them in the usual manner by opening up the fumigated room for one hour and had found that

the discoids then contained only 0.03 of 1 per cent of their original HCN content.

Comparison of 30 or 40 separate discoids with each other showed them to be quite uniform in thickness, approximately one-eighth inch thick. Unlike the original discoids, which were manufactured of pulp paper, these are made from wood pulp and are manufactured under a controlled process insuring uniform thickness.

On the basis of these and former comparative tests, it can be stated with reasonable certainty that from the standpoint of fumigation effectiveness there is no material difference between HCN discoids and Zyklon. The only point at which they appear to differ at all in their effect is that the discoids hold the warning gas (chloropicrin) much longer than does the Zyklon, and consequently clearing is delayed, particularly if clearing is based on the disposition of the warning gas. It can hardly be said that this is a disadvantage, because the warning gas is mixed with the HCN for the specific purpose of giving warning of the presence of the HCN. If the warning gas persists after the HCN has disappeared the margin of safety becomes greater.

The new disks are packed 64 to the 1-pound can, so that each disk contains approximately one-quarter ounce of liquid HCN. This does not appear to be too great a number, and it certainly simplifies the problem of placing accurate dosage in small compartments. The discoids can be turned into the hand and counted. If turned out into the bare hand, some effect is noted from the HCN, but the protection even of cotton gloves eliminates nearly all this.

The amount of HCN retained by the discoids hardly seems sufficient to be a source of danger. To become so, it would be necessary to gather up all of the discoids from a hold and confine them with a man in a very small room for several hours. The retained chloropicrin can hardly be regarded as a danger, since its presence in dangerous amounts is intolerable on account of the tear effect.

On this vessel a mess room, heavily infested with cockroaches, was fumigated with discoids, using 10 ounces per thousand cubic feet and exposure for two hours. Two thousand (estimated) cockroaches were gathered after fumigation and taken to the laboratory. Next morning six had recovered. These are believed to have emerged late in the fumigation from behind a large mirror attached to one wall.

TESTS ON THE S. S. "PRESIDENT FILLMORE"

In the comparative test of superstructure fumigation, made with the improved discoids on the S. S. *President Fillmore,* May 1, 1930, it was possible to fumigate two sides of a deck structure, comprising the smoking room and sitting room, separated by a partition running from side to side, and subject to similar atmospheric conditions on both sides.

Concentration tests taken at the end of 30 minutes, 1 hour, and 2 hours showed a concentration in each compartment of approximately 2 ounces per thousand cubic feet. This is unusually high for the superstructure, but in this instance was probably due to the exceptionally close fit of all windows and doors and the almost total lack of wind.

When opened both sides of this superstructure compartment cleared rapidly, there being very little difference in persistence of tear effect, although the discoids smelled decidedly more strongly of chloropicrin than did the Zyklon residue. Despite the fact that a few of the discoids had been purposely left piled on top of each other, all of them were found quite dry in appearance and feel and, so far as could be determined by the sense of smell, entirely free of HCN.

Sixteen of the discoids were brought to the laboratory and put in a jar of 1½ cubic feet capacity with two white rats. An equivalent amount of the Zyklon residue was put into a similar jar with two other white rats. The rats in the jar with the discoids were both dead at the end of two hours, while those with the Zyklon residue showed no signs of being affected throughout 24 hours.

CHEMICAL TESTS OF SPENT DISCOIDS BY THE AMERICAN CYANAMID CO.

Thirty-two of the discoids used in fumigation on the S. S. *President Fillmore* were taken by a representative of the American Cyanamid Co. and analyzed in their laboratory. The report was that the 32 discoids contained a total of 0.014 gram of HCN. It will be noted that if the discoids brought to the laboratory contained the same relative amount, then the 16 placed in a jar with two white rats would have contained 0.007 gram, which, if all became vaporized, would produce a concentration in the jar of 3 grams per thousand cubic feet. This concentration is sufficient to kill white rats in two hours.

The American Cyanamid Co. exposed discoids in a room for a period of two hours followed by an aeration period of one hour. They then analyzed the spent discoids and found in one test that they had lost 99.94 per cent and in another test 99.97 per cent of their original HCN content.

COMMENT

On the basis of these tests there appears to be little to choose between HCN discoids and Zyklon for the purpose of fumigation of ships. Comparative tests showed that the concentration of HCN, produced under similar conditions, was practically identical for both products. Zyklon is slightly more convenient to use in the holds, but is not as readily distributed to the "'tween decks". The discoids provide a means of more easily measuring accurate dosage for superstructure compartments. The spent discoids probably retain a slightly larger amount of HCN than does the Zyklon residue and

obviously hold chloropicrin longer. This latter, however, can hardly be termed a disadvantage, since it supplies a longer warning effect and consequently a greater margin of safety.

The present improved discoids were not supplied the station until warm weather had begun; therefore it has been impossible to test their performance in cold weather. It is, of course, possible that in cold weather the spent discoids might retain a materially larger proportion of HCN, although it does not appear likely that they would retain a dangerous amount.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for June, 1931

The accompanying table, taken from the Statistical Bulletin for July, 1931, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for June as compared with that for the preceding month and for the corresponding month of last year. It also gives the cumulative rates for the period January–June of the years 1930 and 1931. The rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada. In recent years the general death rate in this more or less selected group of persons has averaged about 72 per cent of the rate for the registration area of the United States.

Death rates (annual basis) per 100,000 for principal causes of death

[Industrial insurance department, Metropolitan Life Insurance Co.]

Causes of death	Death rate per 100,000 lives exposed*				
	June, 1931	May, 1931	June, 1930	Cumulative January to June	
				1931	1930
Total, all causes	835.1	841.8	843.2	952.3	936.4
Typhoid fever	1.9	1.6	1.9	1.2	1.3
Measles	5.5	5.9	5.5	4.9	4.7
Scarlet fever	3.7	3.9	2.1	4.0	3.4
Whooping cough	3.2	3.4	3.9	3.7	4.7
Diphtheria	3.3	4.2	3.7	4.7	7.2
Influenza	8.9	16.9	8.0	34.1	21.4
Tuberculosis (all forms)	77.9	79.5	83.9	81.7	86.7
Tuberculosis of respiratory system	67.9	70.0	72.9	72.2	75.2
Cancer	81.2	77.4	77.1	83.1	77.0
Diabetes mellitus	19.4	18.9	15.8	22.7	19.8
Cerebral hemorrhage	59.1	60.4	58.3	65.4	62.9
Organic diseases of heart	139.3	145.3	141.4	162.7	158.5
Pneumonia (all forms)	53.2	71.8	59.1	104.6	102.9
Other respiratory diseases	8.9	10.2	12.0	12.3	12.7
Diarrhea and enteritis	10.8	8.8	16.1	10.2	12.6
Bright's disease (chronic nephritis)	65.8	64.4	70.8	71.8	72.1
Puerperal state	11.4	10.4	12.2	11.9	13.1
Suicides	10.8	9.5	10.0	9.9	9.7
Homicides	6.2	7.3	4.9	6.6	6.3
Other external causes (excluding suicides and homicides)	65.3	51.8	62.7	55.0	58.0
Traumatism by automobiles	22.9	18.1	20.3	19.2	18.4
All other causes	199.3	190.2	193.7	202.0	201.1

*All figures in this table include insured infants under one year of age. The rates for 1931 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

With regard to health conditions in this group for June, 1931, as indicated by mortality, the Bulletin states:

With a single exception, the June rate among Metropolitan industrial policyholders, in 1931 (8.4 per 1,000), was lower than ever registered for any previous June. The excellent health record of the month was brought about, largely, by reductions in the mortality from tuberculosis, heart disease, pneumonia and other respiratory conditions, diarrhea and enteritis, and Bright's disease. Improvement in the above respects more than counterbalanced the higher death rates observed for cancer, diabetes, suicides, homicides, and automobile fatalities.

COURT DECISION RELATING TO PUBLIC HEALTH

Court refuses to pass on constitutionality of milk pasteurization plant law.—(Rhode Island Supreme Court; First Nat. Stores, Inc., et al. *v.* Lewis, Commissioner of Agriculture, 155 A. 534; decided June 26, 1931.) A suit was brought to restrain the State commissioner of agriculture from enforcing certain provisions of chapter 1594 of the Public Laws of 1930. This act related to the pasteurization of milk and the ground of attack on certain of its provisions was that they were unconstitutional because unreasonably discriminatory. The respondent, instead of answering, demurred to the bill, thus admitting the allegations of unreasonable discrimination, and, inferentially, the unconstitutionality of the provisions assailed. Acting pursuant to statute, the superior court certified the cause to the supreme court, but the latter court stated that it was "unwilling to decide a question as to the constitutionality of an act of the general assembly on a record wherein it is admitted as a matter of pleading that the provisions of the act complained of are unreasonably discriminatory" and ordered that the cause be remanded to the superior court "with directions to take such testimony as the parties may offer on issues of fact, relevant to constitutional questions raised by appropriate pleadings, and to then certify the cause to this court."

DEATHS DURING WEEK ENDED AUGUST 8, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended August 8, 1931; and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended August 8, 1931	Corresponding week, 1930
Policies in force	75, 039, 929	75, 893, 116
Number of death claims	11, 944	12, 616
Death claims per 1,000 policies in force, annual rate	8. 3	8. 7
Death claims per 1,000 policies, first 32 weeks of year	10. 2	10. 0

Deaths[1] from all causes in certain large cities of the United States during the week ended August 8, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended Aug. 8, 1931				Corresponding week, 1930		Death rate[2] for the first 32 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,097	10.4	649	[4] 51	11.1	702	12.6	12.5
Akron	40	8.1	9	89	4.9	3	8.0	8.0
Albany[5]	21	8.5	0	0	18.0	3	14.2	15.4
Atlanta	50	9.4	5	51	13.8	9	15.6	16.5
White	23		4	63		4		
Colored	27	(6)	1	29	(6)	5	(6)	(6)
Baltimore[5]	223	14.3	22	75	14.1	25	15.2	14.6
White	164		15	65		18		
Colored	59	(6)	7	109	(6)	7	(6)	(6)
Birmingham	61	11.8	5	50	11.8	5	14.2	14.3
White	34		2	34		1		
Colored	27	(6)	3	73	(6)	4	(6)	(6)
Boston	174	11.6	18	51	12.1	18	14.8	14.7
Bridgeport	23	9.9	4	66	6.0	2	11.6	11.7
Buffalo	122	10.9	12	49	11.7	12	13.7	13.5
Cambridge	28	12.8	3	60	11.0	4	12.8	12.4
Camden	28	12.3	6	105	14.9	3	14.8	14.3
Canton	24	11.7	5	114	6.4	2	10.7	10.5
Chicago[5]	627	9.5	51	45	9.9	67	11.3	10.8
Cincinnati	147	16.8	20	120	13.6	10	16.6	16.1
Cleveland	166	9.5	15	44	9.8	15	11.6	11.6
Columbus	65	11.5	4	39	11.1	7	14.3	16.6
Dallas	52	10.0	2		12.1	14	11.9	12.0
White	35		2			12		
Colored	17	(6)	0		(6)	2	(6)	(6)
Dayton	29	7.3	3	42	7.7	4	12.3	10.5
Denver	65	11.6	5	48	14.3	9	14.5	14.9
Des Moines	25	9.0	2	35	13.1	3	11.7	12.3
Detroit	198	6.2	25	40	8.2	30	8.7	9.8
Duluth	26	13.3	8	196	12.3	2	11.2	11.5
El Paso	25	12.4	5		11.1	4	16.7	18.1
Erie	20	8.9	1	19	9.9	2	10.7	11.5
Fall River[5 7]	15	6.8	0	0	10.9	2	11.9	12.8
Flint	7	2.2	0	0	10.6	6	7.4	9.5
Fort Worth	32	10.0	2		12.1	2	11.3	11.4
White	24		2			2		
Colored	8	(6)	0		(6)	0	(6)	(6)
Grand Rapids	28	8.5	2	30	9.9	5	9.4	10.9
Houston	53	8.9	4		11.5	9	11.4	12.5
White	29		3			9		
Colored	24	(6)	1		(6)	0	(6)	(6)
Indianapolis	107	15.1	4	33	25.8	5	14.4	15.2
White	87		4	38		4		
Colored	20	(6)	0	0	(6)	1	(6)	(6)
Jersey City	60	9.8	9	80	10.4	6	12.2	11.9
Kansas City, Kans	26	11.0	2	41	13.2	8	13.5	11.5
White	19		2	49		7		
Colored	7	(6)	0	0	(6)	1	(6)	(6)
Kansas City, Mo	104	13.3	11	83	14.9	3	14.0	13.6
Knoxville	24	11.5	4	85	17.1	6	13.0	14.5
White	22		4	95		6		
Colored	2	(6)	0	0	(6)	0	(6)	(6)
Long Beach	29	9.9	1	24	8.3	0	10.1	10.0
Los Angeles	216	8.5	19	55	10.1	22	11.0	11.3
Louisville	85	14.4	10	86	16.1	6	14.9	14.1
White	63		7	69		5		
Colored	22	(6)	3	199	(6)	1	(6)	(6)
Lowell[7]	20	10.4	2	51	9.8	2	13.0	14.1
Lynn	11	5.6	2	52	9.2	0	10.3	11.2
Memphis	70	14.1	9	95	15.0	10	16.9	18.1
White	32		6	100		5		
Colored	38	(6)	3	87	(6)	5	(6)	(6)
Miami	21	9.7	1	25	9.9	4	12.3	11.7
White	17		1	35		0		
Colored	4	(6)	0	0	(6)	4	(6)	(6)

Footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended August 8, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended Aug. 8, 1931				Corresponding week, 1930		Death rate [2] for the first 32 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	96	8.5	12	52	7.1	6	9.8	10.0
Minneapolis	78	8.6	6	39	12 6	10	11.9	11.0
Nashville	54	18.1	8	119	20.6	13	17.4	17.1
White	35		5	100		9		
Colored	19	(6)	3	177	(6)	4	(6)	(6)
New Bedford [7]	17	7.9	1	27	8 3	2	13.0	11 6
New Haven	36	11.5	1	19	13.8	2	12.7	13.7
New Orleans	128	14.3	13	71	14.7	7	17.5	18.1
White	78		7	58		3		
Colored	50	(6)	6	98	(6)	4	(6)	(6)
New York	1,358	10 0	109	46	9.9	105	11.8	11.4
Bronx Borough	200	7.8	10	23	7.1	11	8.7	8.3
Brooklyn Borough	478	9.5	49	52	8.9	41	10.9	10.4
Manhattan Borough	501	14.4	38	65	15.1	45	18.0	17.0
Queens Borough	146	6.6	8	22	5.8	7	7.6	7.4
Richmond Borough	33	10 5	4	72	15.1	1	14.1	14 9
Newark, N. J	74	8.7	8	42	10.7	6	12.3	12.7
Oakland	48	8.6	2	26	10 6	2	10.7	11.2
Oklahoma City	31	8 2	6	83	12.8	12	11.4	10 7
Omaha	68	16.4	4	45	15.1	3	14.5	14.4
Paterson	27	10 1	4	69	10 5	1	14 0	12.7
Peoria	21	10 1	3	79	15 8	1	13.2	13.0
Philadelphia	427	11.3	32	46	10.8	47	13.9	13.1
Pittsburgh	143	11 0	13	45	12.3	21	15.4	14.4
Portland, Oreg	58	9.9	0	0	11.2	1	12.0	12.7
Providence	45	9.2	6	55	10.7	6	13 4	13.8
Richmond	55	15.6	10	146	14.8	5	16.3	15.6
White	23		3	66		1		
Colored	32	(6)	7	304	(6)	4	(6)	(6)
Rochester	57	9.0	2	18	8.4	5	12.3	11.9
St. Louis	211	13.3	18	61	13.1	8	16 2	15.0
St. Paul	48	9.1	5	52	7.5	2	11.3	10.5
Salt Lake City [5]	22	8 0	1	15	11.9	2	12.4	13.0
San Antonio	60	13.0	10		15.0	12	15.3	17.8
San Diego	26	8.7	3	61	12.6	2	14.0	14.7
San Francisco	136	10.9	4	27	9.3	4	13.2	13.3
Schenectady	20	10.8	2	59	7.1	1	10.7	11.6
Seattle	66	9.3	2	19	10.2	7	11.7	11.1
Somerville	11	5.5	2	74	9.5	1	9.5	10.3
South Bend	18	8.7	2	50	6.0	4	8.5	9 3
Spokane	27	12.1	4	104	6.8	1	12 6	12.6
Springfield, Mass	24	8 2	0	0	10.4	4	12.4	12.7
Syracuse	34	8.3	7	83	10.7	5	12.0	12.1
Tacoma	16	7.7	1	26	17.1	0	12.6	12.9
Toledo	82	14 5	8	73	10.9	4	12.5	13.2
Trenton	33	13.9	2	35	15.2	3	17.3	17.2
Utica	24	12.2	1	26	17.4	2	14.6	15.8
Washington, D. C	146	15.4	17	94	14.2	16	16.4	15.7
White	95		10	82		5		
Colored	51	(6)	7	120	(6)	11	(6)	(6)
Waterbury	10	5.2	1	30	9.9	3	9.9	10.4
Wilmington, Del. [7]	31	15.2	2	43	15.7	2	14.6	14.8
Worcester	40	10.6	2	27	11.2	4	12.9	13.5
Yonkers	11	4.1	0	0	9.2	4	8.8	8.4
Youngstown	28	8.4	3	42	11.0	7	10.8	10.5

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 15, 1931, and August 16, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 15, 1931, and August 16, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930
New England States:								
Maine				1	1	2	2	0
New Hampshire						1	0	0
Vermont					6		0	0
Massachusetts	31	44	1	1	65	55	1	1
Rhode Island	2				21	2	0	0
Connecticut	13	4	1		23	11	0	0
Middle Atlantic States:								
New York	62	48	[1] 2	[1] 0	126	39	11	18
New Jersey	19	37	2		27	33	5	7
Pennsylvania	50	46			111	129	6	8
East North Central States:								
Ohio	21	32	10	7	105	49	6	4
Indiana	13	6			6	5	2	1
Illinois	41	56	2	3	67	16	4	6
Michigan	21	29			34	46	4	16
Wisconsin	10	17	12	4	40	66	0	4
West North Central States.								
Minnesota	14	6	1	4	5	3	1	3
Iowa	6	2			3		0	1
Missouri	15	8			3	9	1	2
North Dakota	4	2			10	5	1	3
South Dakota	2	7				3	0	0
Nebraska		2		1	3	7	0	0
Kansas	3	7			6	14	1	1
South Atlantic States:								
Delaware		2			1	3	0	0
Maryland [2, 3]	7	9	2	4	6	7	2	0
District of Columbia	7	3			1	6	1	0
West Virginia	5	8		2	55	12	1	0
North Carolina [3]	22	54	1		16	7	1	4
South Carolina	11	18	68	29	11	5	1	0
Georgia [3]	17		6	10	14	6	0	1
Florida	3	4	1		1	2	0	3

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 19 cases; 2 cases in Maryland; 1 case in North Carolina; 7 cases in Georgia; 5 cases in Alabama; and 4 cases in Texas.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 15, 1931, and August 16, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930	Week ended Aug 15, 1931	Week ended Aug. 16, 1930	Week ended Aug 15, 1931	Week ended Aug. 16, 1930	Week ended Aug. 15, 1931	Week ended Aug 16, 1930
East South Central States:								
Kentucky					11		1	0
Tennessee	14	3	13	1	4	4	4	0
Alabama [3]	16	15	3	6	17	15	5	3
Mississippi	11	9					0	1
West South Central States:								
Arkansas	27			4			2	0
Louisiana	12	12	5	10	1	11	0	0
Oklahoma [4]	4	4	4	8	2	4	0	1
Texas [3]	18	15	6		4	7	0	2
Mountain States:								
Montana		1			6	4	0	0
Idaho				1			0	0
Wyoming	1						2	0
Colorado	9	2				12	0	2
New Mexico	1	8			1	2	0	0
Arizona		2	4		2	9	0	0
Utah			6		4	1	0	2
Pacific States:								
Washington	3	7			8	26	1	4
Oregon	2	2	8	1	4	15	0	0
California	36	42	12		53	85	3	3

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930
New England States:								
Maine	2	2	4	5	0	0	1	3
New Hampshire	3	0	4	3	0	0	1	0
Vermont	5	0	12	2	2	0	0	0
Massachusetts	90	25	50	45	0	0	12	21
Rhode Island	18	2	3	3	0	0	7	1
Connecticut	67	1	12	5	0	0	6	0
Middle Atlantic States:								
New York	600	48	77	49	1	1	42	28
New Jersey	97	3	29	16	0	0	11	16
Pennsylvania	8	9	76	62	0	0	37	56
East North Central States:								
Ohio	9	19	75	71	2	7	38	45
Indiana	3	4	10	17	5	13	7	12
Illinois	26	14	54	56	7	29	27	39
Michigan	33	6	59	41	7	20	7	8
Wisconsin	24	1	16	24	2	2	1	7
West North Central States:								
Minnesota	29	25	19	13	0	2	3	2
Iowa	1	2	10	1	9	4	3	1
Missouri	0	6	8	9	1	7	8	35
North Dakota	0	0	1	7	2	13	23	3
South Dakota	1	4	0	0	0	3	1	9
Nebraska	0	1	2	3	0	8	7	4
Kansas	0	17	12	6	3	12	7	26
South Atlantic States:								
Delaware	0	0	4	1	0	0	3	7
Maryland [2] [3]	1	1	10	8	0	0	22	65
District of Columbia	1	0	1	4	0	0	1	5
West Virginia	2	1	7	13	0	1	32	39
North Carolina [3]	10	2	29	34	0	3	50	68
South Carolina	0	0	5	9	0	0	70	41
Georgia [3]	1	2	4	7	2	0	69	50
Florida	0	0	2	3	0	0	4	6

[2] Week ended Friday.
[3] Typhus fever: 1931. 19 cases; 2 cases in Maryland; 1 case in North Carolina; 7 cases in Georgia; 5 cases in Alabama; and 4 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 15, 1931, and August 16, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 15, 1931	Week ended Aug 16, 1930	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930	Week ended Aug. 15, 1931	Week ended Aug. 16, 1930
East South Central States:								
Kentucky	0	0	7	4	0	13	65	50
Tennessee	0	0	18	7	34	0	94	104
Alabama [3]	0	0	14	13	0	0	44	32
Mississippi	1	3	8	9	12	0	22	28
West South Central States:								
Arkansas	0	3	3	1	2	0	56	34
Louisiana	0	20	4	3	1	0	51	56
Oklahoma [4]	1	14	9	6	0	3	42	57
Texas [3]	1	5	12	9	1	53	43	35
Mountain States:								
Montana	1	0	12	9	2	1	3	2
Idaho	0	1	0	0	0	2	2	0
Wyoming	0	0	0	4	0	0	0	0
Colorado	0	6	2	7	0	0	13	10
New Mexico	0	1	4	2	1	1	6	5
Arizona	0	1	1	3	0	0	0	4
Utah	0	0	2	3	0	0	2	2
Pacific States:								
Washington	3	1	5	14	5	10	4	3
Oregon	0	2	4	4	9	1	5	8
California	2	51	21	27	1	5	13	18

[3] Typhus fever: 1931, 19 cases; 2 cases in Maryland; 1 case in North Carolina; 7 cases in Georgia; 5 cases in Alabama; and 4 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June, 1931										
Arkansas	1	5	23	122	146	838	2	26	113	53
Colorado	1	23			480	1	2	73	26	20
July, 1931										
Idaho	5	4			15		0	17	8	2
Indiana	14	45	5		274		0	116	159	23
Maine	1	8			64	1	6	35	0	4
Maryland	7	36	5	3	306	3	1	72	1	63
Massachusetts	6	168	9	5	965	3	60	482	0	37
Michigan	13	93	1	1	541	1	29	462	39	19
New Jersey	10	91	1		771		40	244	1	21
Ohio	9	74	21	3	1,080	1	5	295	104	81
Porto Rico		46	1,228	3,561	14	2	0		0	28
West Virginia	4	13			235	2	2	29	7	73

June, 1931	Cases
Arkansas:	
Chicken pox	54
Hookworm disease	4
Mumps	18
Ophthalmia neonatorum	3
Trachoma	1
Whooping cough	41
Colorado:	
Chicken pox	169
German measles	2
Mumps	153
Paratyphoid fever	3
Rocky Mountain spotted or tick fever	1
Septic sore throat	2
Vincent's angina	5
Whooping cough	248

July, 1931	Cases
Chicken pox:	
Idaho	10
Indiana	42
Maine	45
Maryland	72
Massachusetts	370
Michigan	343
New Jersey	324
Ohio	288
Porto Rico	5
West Virginia	29
Diarrhea:	
Maryland	54
Diarrhea and enteritis:	
Ohio (under 2 years)	41
Dysentery:	
Maryland	19
Michigan	1
New Jersey	4
Ohio	2
Porto Rico	12
Filariasis:	
Porto Rico	3
Food poisoning:	
Ohio	37
German measles:	
Maine	2
Maryland	10
Massachusetts	71
New Jersey	50
Ohio	35
Impetigo contagiosa:	
Maryland	8
Lead poisoning:	
Massachusetts	2
New Jersey	1
Leprosy:	
Porto Rico	1
Lethargic encephalitis:	
Maine	1
Michigan	8
New Jersey	4
Ohio	3
Mumps:	
Idaho	5
Indiana	14
Maine	55
Maryland	57

Mumps—Continued.	Cases
Massachusetts	270
Michigan	222
New Jersey	129
Ohio	427
Porto Rico	8
Ophthalmia neonatorum:	
Massachusetts	108
New Jersey	4
Ohio	74
Porto Rico	4
Paratyphoid fever:	
New Jersey	1
Porto Rico	1
Puerperal septicemia.	
Ohio	9
Porto Rico	7
Rabies in animals:	
Maryland	5
Rabies in man:	
Massachusetts	1
Michigan	1
Ohio	1
Rocky Mountain spotted or tick fever:	
Maryland	4
Septic sore throat:	
Indiana	1
Maryland	6
Massachusetts	14
Michigan	4
Ohio	48
Tetanus.	
Maine	1
Maryland	3
Massachusetts	6
New Jersey	1
Ohio	9
Porto Rico	6
Tetanus, infantile:	
Porto Rico	18
Trachoma:	
Massachusetts	3
Tularaemia:	
Ohio	1
Typhus fever:	
Maryland	3
Undulant fever:	
Idaho	2
Maine	1
Maryland	7
Massachusetts	1
Michigan	1
New Jersey	3
Ohio	7
Vincent's angina:	
Maine	13
Maryland	9
Whooping cough:	
Idaho	8
Indiana	337
Maine	55
Maryland	433
Massachusetts	520
Michigan	1,370
New Jersey	1,536
Porto Rico	338
West Virginia	252

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,555,000. The estimated population of the 89 cities reporting deaths is more than 31,010,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended August 8, 1931, and August 9, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	476	571	
96 cities	201	230	359
Measles:			
45 States	1,238	1,109	
96 cities	377	306	
Meningococcus meningitis:			
46 States	72	91	
96 cities	24	54	
Poliomyelitis:			
46 States	1,029	253	
Scarlet fever:			
46 States	812	621	
96 cities	296	194	250
Smallpox:			
45 States	159	259	
96 cities	20	17	16
Typhoid fever:			
46 States	909	980	
96 cities	140	107	133
Deaths reported			
Influenza and pneumonia:			
89 cities	300	324	
Smallpox:			
89 cities	1	0	
Minneapolis, Minn.	1	0	

City reports for week ended August 8, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	1		0	0	0	
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	0	0		0	0	0	0

City reports for week ended August 8, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND—con.								
Vermont:								
Barre	0	0	0	--------	0	0	0	0
Burlington	0	0	0	--------	0	0	2	0
Massachusetts:								
Boston	6	15	21	1	1	2	4	4
Fall River	0	1	0	--------	0	8	2	0
Springfield	1	1	0	--------	0	4	1	2
Worcester	5	2	0	--------	0	1	3	1
Rhode Island:								
Pawtucket	0	0	0	--------	0	1	0	0
Providence	3	2	4	--------	0	34	5	4
Connecticut								
Bridgeport	0	2	0	--------	0	5	1	0
Hartford	0	1	1	--------	0	1	0	3
New Haven	2	0	0	--------	0	0	2	0
MIDDLE ATLANTIC								
New York:								
Buffalo	2	7	3	--------	0	8	4	5
New York	23	104	43	1	0	69	15	81
Rochester	0	2	1	1	0	16	6	3
Syracuse	0	1	0	--------	0	12	0	0
New Jersey.								
Camden	0	3	0	--------	0	0	0	4
Newark	4	8	1	1	0	5	2	4
Trenton	0	1	0	1	0	2	3	1
Pennsylvania:								
Philadelphia	24	28	6	6	4	13	12	9
Pittsburgh	1	10	5	2	2	2	13	9
Reading	1	1	0	--------	0	0	0	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	3	0	--------	0	1	1	4
Cleveland	7	14	2	5	0	30	24	6
Columbus	1	2	2	1	0	0	1	1
Toledo	6	2	1	--------	1	6	1	3
Indiana.								
Fort Wayne	0	1	1	--------	0	0	0	1
Indianapolis	0	2	0	--------	0	1	5	9
South Bend	2	1	0	--------	0	0	0	1
Terre Haute	1	0	0	--------	0	0	0	0
Illinois:								
Chicago	6	52	33	--------	1	52	8	22
Springfield	0	0	0	--------	0	1	4	2
Michigan:								
Detroit	4	23	9	--------	1	6	1	6
Flint	3	1	3	--------	0	0	1	0
Grand Rapids	1	1	0	--------	0	3	1	1
Wisconsin:								
Kenosha	0	0	0	--------	0	0	11	0
Madison	1	0	0	--------	--------	0	6	--------
Milwaukee	12	6	1	--------	0	48	21	2
Racine	1	1	0	--------	0	1	7	0
Superior	3	1	0	--------	0	0	0	2
WEST NORTH CENTRAL								
Minnesota:								
Duluth	2	0	0	--------	0	0	1	0
Minneapolis	1	8	3	--------	0	3	3	1
St. Paul	--------	4	--------	--------	--------	--------	--------	--------
Iowa:								
Des Moines	0	1	0	--------	--------	0	0	--------
Sioux City	1	0	2	--------	--------	0	0	--------
Waterloo	0	0	1	--------	--------	0	1	--------
Missouri:								
Kansas City	0	1	2	--------	0	0	0	7
St. Joseph	0	0	1	--------	0	0	0	1
St. Louis	0	13	5	--------	--------	0	4	5

City reports for week ended August 8, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL—Contd.								
North Dakota:								
Fargo	0	0	0		0	1	1	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	1	0	0			0	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	1	2	1		0	0	0	3
Kansas:								
Topeka	1	0	0		0	2	11	0
Wichita	0	1	0		0	1	0	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	0	1		0	0	2	3
Maryland:								
Baltimore	2	9	4		0	6	4	15
Cumberland	0	0	0		0	0	0	0
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	3	5	4		0	4	0	5
Virginia:								
Lynchburg	2	0	1		0	1	0	1
Norfolk	0	0	0		0	0	0	0
Richmond	0	2	1		0	0	0	3
Roanoke	0	0	0		0	1	0	0
West Virginia:								
Charleston	0	0	0		0	0	0	0
Wheeling	0	1	0		0	3	0	0
North Carolina:								
Raleigh	0	0	0		0	1	0	3
Wilmington	0	0	1		0	0	0	1
Winston-Salem	0	1	0		0	0	0	1
South Carolina:								
Charleston	0	0	0	7	0	0	0	3
Columbia	0	0	0		0	0	0	2
Greenville	0	0	0		0	0	0	0
Georgia:								
Atlanta	0	2	0		0	0	0	1
Brunswick	0	0	0		0	0	0	0
Savannah	0	1	1	2	0	1	0	0
Florida:								
Miami	0	1	0		0	0	0	0
Tampa	0	0	0		0	0	0	2
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	1		0	0	0	2
Tennessee:								
Memphis	0	1	3		2	0	0	3
Nashville	0	1	1		0	1	0	2
Alabama:								
Birmingham	0	1	1		0	1	0	1
Mobile	0	0	1		0	0	0	2
Montgomery	0	0	0			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	0			0	0	
Little Rock	0	0	1		0	0	0	2
Louisiana:								
New Orleans	2	5	6	1	1	0	0	7
Shreveport	0	0	1		0	1	0	1
Oklahoma:								
Oklahoma City	0	1	2		2	0	0	3
Texas:								
Dallas	0	3	4		0	0	0	3
Fort Worth	0	2	0		0	1	0	2
Galveston	0	0	0		0	0	0	0
Houston	0	2	5		0	0	0	3
San Antonio	0	1	2		0	0	1	2

City reports for week ended August 8, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MOUNTAIN								
Montana:								
Billings	1	0	0	----------	0	3	0	0
Great Falls	1	0	0	----------	0	2	2	2
Helena	0	0	0	----------	0	0	0	0
Missoula	0	0	0	----------	0	0	0	0
Idaho:								
Boise	0	0	0	----------	0	1	3	0
Colorado:								
Denver	9	6	3	----------	0	2	5	3
Pueblo	1	0	0	----------	0	0	0	0
New Mexico:								
Albuquerque	0	0	1	----------	0	0	0	0
Arizona:								
Phoenix	0	0	0	----------	0	0	0	1
Utah:								
Salt Lake City	1	1	0	----------	0	0	1	0
Nevada:								
Reno	0	0	0	----------	0	0	0	0
PACIFIC								
Washington:								
Seattle	5	1	0	----------	----------	4	3	----------
Spokane	0	1	0	----------	----------	1	0	----------
Tacoma	1	2	1	----------	0	0	1	2
Oregon:								
Portland	0	4	0	----------	0	1	2	2
Salem	0	0	0	----------	0	0	0	0
California:								
Los Angeles	13	20	5	8	2	10	13	8
Sacramento	0	1	1	----------	0	1	6	0
San Francisco	----------	7	----------	----------	----------	----------	----------	----------

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	0	0	0	0	0	2	0	0	0	7	19
New Hampshire:											
Concord	0	0	0	0	0	1	0	0	0	0	10
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	5
Burlington	0	0	0	2	0	0	0	0	0	3	12
Massachusetts:											
Boston	17	8	0	0	0	10	2	3	0	33	174
Fall River	1	2	0	0	0	0	0	1	0	2	15
Springfield	1	1	0	0	0	2	0	0	1	6	23
Worcester	2	3	0	0	0	0	0	0	0	22	40
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	14
Providence	3	3	0	0	0	0	1	1	0	3	45
Connecticut:											
Bridgeport	2	0	0	0	0	0	0	1	0	9	28
Hartford	1	1	0	0	0	2	0	0	1	9	40
New Haven	0	0	0	0	0	1	1	0	0	2	36
MIDDLE ATLANTIC											
New York:											
Buffalo	6	6	0	0	0	6	0	0	0	7	119
New York	30	29	0	0	0	79	23	25	2	254	1,360
Rochester	2	18	0	0	0	3	1	0	0	7	53
Syracuse	1	10	0	0	0	0	0	0	0	16	43

City reports for week ended August 8, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
MIDDLE ATLANTIC—continued											
New Jersey:											
Camden	1	3	0	0	0	1	1	0	0	0	28
Newark	4	5	0	0	0	4	1	0	0	162	78
Trenton	0	1	0	0	0	3	0	1	0	7	33
Pennsylvania:											
Philadelphia	16	29	0	0	0	30	6	8	0	97	427
Pittsburgh	7	14	0	0	0	7	2	1	0	65	143
Reading	0	0	0	0	0	0	0	1	0	2	25
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	9	1	0	0	9	2	1	1	4	147
Cleveland	10	12	0	0	0	10	3	1	1	80	166
Columbus	2	1	0	0	0	3	1	0	0	0	65
Toledo	2	0	0	0	0	2	2	0	0	36	82
Indiana.											
Fort Wayne	0	0	1	0	0	2	0	0	0	0	39
Indianapolis	2	3	2	3	0	1	1	0	0	26	-------
South Bend	1	0	0	0	0	0	0	0	0	0	16
Terre Haute	0	1	0	0	0	0	0	0	0	0	20
Illinois:											
Chicago	31	38	1	0	0	46	5	7	0	179	627
Springfield	1	1	0	0	0	1	0	3	0	0	23
Michigan:											
Detroit	24	16	0	1	0	22	4	2	0	151	198
Flint	4	2	1	0	0	0	0	0	0	3	7
Grand Rapids	3	1	0	0	0	0	0	0	0	6	23
Wisconsin:											
Kenosha	0	3	1	0	0	0	0	0	0	0	6
Madison	1	0	0	0	-------	-------	0	1	-------	2	-------
Milwaukee	5	5	0	0	0	7	1	2	0	84	96
Racine	1	5	0	0	0	0	0	0	0	21	21
Superior	2	1	0	0	0	0	0	0	0	0	11
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	0	0	0	0	0	0	0	0	0	26
Minneapolis	10	5	0	2	1	4	0	1	0	0	78
St. Paul	6	-------	0	-------	-------	-------	2	-------	-------	-------	-------
Iowa:											
Davenport	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------
Des Moines	2	0	0	3	-------	-------	0	0	-------	0	25
Sioux City	1	0	0	0	-------	-------	0	0	-------	6	-------
Waterloo	0	0	1	0	-------	-------	0	0	-------	2	-------
Missouri:											
Kansas City	2	1	0	0	0	11	3	3	1	7	104
St. Joseph	0	2	0	0	0	1	1	0	0	0	39
St. Louis	7	2	0	3	0	20	5	4	3	85	211
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	3	2
Grand Forks	0	0	1	0	-------	-------	0	0	-------	0	-------
South Dakota:											
Aberdeen	0	0	0	0	-------	-------	0	0	-------	4	-------
Sioux Falls	1	0	0	0	-------	-------	0	0	-------	0	11
Nebraska:											
Omaha	1	0	0	2	0	2	0	1	0	5	68
Kansas:											
Topeka	0	0	0	0	0	0	1	1	0	9	7
Wichita	1	0	1	0	0	0	0	0	0	0	-------
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	0	0	0	0	2	0	0	0	3	31
Maryland:											
Baltimore	5	4	0	0	0	15	7	4	0	101	223
Cumberland	0	0	0	0	0	0	0	1	0	0	13
Frederick	0	0	0	0	0	0	0	0	0	0	3

City reports for week ended August 8, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
SOUTH ATLANTIC—continued											
District of Columbia:											
Washington	4	5	0	0	0	9	3	1	1	25	146
Virginia:											
Lynchburg	0	0	0	0	0	0	1	3	1	0	18
Norfolk	0	3	0	0	0	1	1	1	0	2	--------
Richmond	2	4	0	0	0	4	2	0	0	15	51
Roanoke	1	0	1	0	0	3	0	1	0	10	20
West Virginia:											
Charleston	0	0	0	0	0	0	1	1	0	4	22
Wheeling	1	0	0	0	0	1	0	1	1	11	21
North Carolina:											
Raleigh	0	1	0	0	0	2	1	0	0	9	16
Wilmington	0	0	0	0	0	1	0	0	0	7	8
Winston-Salem	1	0	0	0	0	0	1	0	0	25	10
South Carolina:											
Charleston	0	0	0	0	0	1	2	4	0	1	22
Columbia	0	0	0	0	0	1	2	0	0	3	21
Greenville	0	0	0	0	0	0	1	0	0	0	--------
Georgia:											
Atlanta	2	5	0	1	0	5	3	8	0	0	50
Brunswick	0	0	0	0	0	0	0	0	0	0	2
Savannah	0	0	0	0	0	1	1	2	1	0	33
Florida:											
Miami	0	1	0	0	0	2	0	0	0	2	21
Tampa	0	0	0	0	0	1	0	1	0	0	24
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	2	0	0	0	1	1	0	0	0	26
Tennessee:											
Memphis	1	1	0	0	0	4	10	2	0	25	70
Nashville	1	0	0	0	0	5	5	2	1	6	54
Alabama:											
Birmingham	1	3	0	0	0	2	5	0	1	12	61
Mobile	0	1	0	0	0	1	1	1	0	0	18
Montgomery	0	0	0	0	--------	--------	2	0	--------	0	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0	--------	--------	0	2	--------	1	--------
Little Rock	0	1	0	0	0	3	1	0	0	0	6
Louisiana:											
New Orleans	3	8	0	0	0	19	4	[1] 18	5	0	128
Shreveport	0	0	0	0	0	0	1	5	1	4	21
Oklahoma:											
Oklahoma City	0	0	0	0	0	1	3	3	1	0	31
Texas:											
Dallas	2	0	2	0	0	5	3	2	0	5	52
Fort Worth	1	2	0	0	0	1	2	3	1	0	32
Galveston	0	0	0	0	0	3	0	0	0	0	15
Houston	1	3	0	0	0	3	1	0	0	0	53
San Antonio	1	0	0	0	0	10	1	1	0	0	60
MOUNTAIN											
Montana:											
Billings	0	0	1	0	0	0	0	0	0	3	6
Great Falls	0	1	0	0	0	0	0	0	0	3	6
Helena	0	0	0	1	0	0	0	0	0	0	7
Missoula	0	0	0	0	0	0	0	0	0	0	--------
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	1	6
Colorado:											
Denver	3	5	0	0	0	8	1	0	0	26	52
Pueblo	0	0	0	0	0	1	0	5	1	1	11
New Mexico:											
Albuquerque	0	0	0	0	0	4	0	3	0		1

City reports for week ended August 8, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
MOUNTAIN—con.											
Arizona:											
Phoenix	0	0	0	0	0	1	0	0	0	0	-------
Utah.											
Salt Lake City	1	1	0	0	0	0	2	0	0	5	22
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	8
PACIFIC											
Washington:											
Seattle	3	3	1	1	-------	-------	1	0	-------	19	-------
Spokane	1	1	0	1	-------	-------	0	0	-------	5	-------
Tacoma	2	1	1	0	0	2	1	2	0	2	16
Oregon											
Portland	2	0	4	8	0	1	0	1	0	1	58
Salem	0	0	0	0	0	0	0	0	0	0	-------
California:											
Los Angeles	11	5	1	4	0	24	3	5	0	32	216
Sacramento	1	0	0	1	0	2	1	0	0	0	22
San Francisco	5	-------	1	-------	-------	-------	1	-------	-------	-------	-------

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis: Cases	Poliomyelitis: Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	2	0	0	0	0	0
New Hampshire:									
Nashua	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	0	0	0	0	0	0	1	41	4
Fall River	1	0	0	0	0	0	0	1	0
Worcester	0	0	0	0	0	0	1	1	0
Rhode Island:									
Pawtucket	0	0	0	0	0	0	0	1	0
Providence	0	0	0	0	0	0	0	13	0
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	3	0
Hartford	0	0	0	0	0	0	0	14	1
New Haven	0	0	0	0	0	0	0	26	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	0	0	1	1	0
New York	3	1	3	0	0	0	7	591	70
Rochester	0	0	0	0	0	0	0	1	0
New Jersey:									
Camden	0	0	0	0	0	0	0	2	0
Newark	1	0	0	0	0	0	0	5	1
Pennsylvania:									
Philadelphia	3	1	0	0	0	0	1	2	0
Pittsburgh	1	0	2	1	0	0	0	1	0

[1] 12 nonresident.

City reports for week ended August 8, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	2	1	0	0	0	0	0	2	1
Cleveland	0	0	0	0	0	1	0	1	0
Columbus	0	0	0	0	0	0	0	1	0
Indiana:									
Indianapolis	1	1	0	0	0	0	0	0	0
Illinois:									
Chicago	3	2	0	0	0	0	1	7	0
Michigan:									
Detroit	0	2	1	0	0	0	0	5	2
Flint	0	0	0	0	0	0	0	1	0
Grand Rapids	0	0	0	0	0	0	0	2	0
Wisconsin:									
Milwaukee	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	1	0	0	0	0	7	0
Minneapolis	1	0	0	0	0	0	1	2	0
Missouri:									
St. Joseph	0	0	0	0	0	0	0	1	0
St. Louis	1	0	0	0	0	0	1	1	0
Nebraska:									
Omaha	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Delaware:									
Wilmington	0	0	0	0	0	0	0	1	0
Maryland:									
Baltimore	0	0	1	1	0	0	0	0	0
District of Columbia:									
Washington	0	0	0	0	0	0	0	1	0
North Carolina:									
Winston-Salem	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston	1	0	0	0	9	1	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Greenville	1	0	0	0	0	0	0	0	0
Georgia:									
Atlanta [1]	0	0	0	0	4	4	0	2	0
Savannah [2]	0	0	0	0	4	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	2	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	0	1	0	0	1	2	0	0	0
Mobile	0	0	0	0	3	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	0	0	0	0	1	1	0	0	0
Texas:									
Dallas	0	0	0	0	1	0	0	0	0
PACIFIC									
Washington:									
Seattle	0	0	0	0	0	0	0	1	0
Spokane	0	0	0	0	0	0	0	3	0
Tacoma	0	0	0	0	0	0	0	2	0
California:									
Los Angeles	3	2	0	0	0	0	2	4	0

[1] Typhus fever, 1 case at Atlanta, Ga.

[2] Dengue, 1 case at Savannah, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended August 8, 1931, compared with those for a like period ended August 9, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, July 5 to Aug. 8, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug 2, 1930	Aug. 8, 1931	Aug. 9, 1930
98 cities	43	58	42	48	33	37	[2] 36	38	[3] 32	37
New England	60	41	65	36	50	24	53	36	65	34
Middle Atlantic	50	49	35	46	34	33	31	34	26	32
East North Central	41	86	52	66	39	49	[4] 38	48	31	48
West North Central	31	68	31	39	33	35	17	35	[5] 32	29
South Atlantic	18	32	24	46	28	38	32	40	26	18
East South Central	23	24	29	12	12	24	12	6	41	18
West South Central	61	59	47	35	24	31	61	35	64	49
Mountain	17	26	61	70	35	70	35	35	26	18
Pacific	41	53	51	32	16	28	[6] 62	45	[6] 18	57

MEASLES CASE RATES

	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug 2, 1930	Aug. 8, 1931	Aug. 9, 1930
98 cities	316	252	181	147	133	105	[2] 94	67	[3] 60	49
New England	351	460	317	256	209	191	132	106	135	99
Middle Atlantic	311	305	142	195	111	144	84	87	57	61
East North Central	527	154	320	70	214	59	[4] 155	33	87	27
West North Central	103	130	61	50	34	64	27	43	[5] 15	52
South Atlantic	259	142	107	122	83	50	47	60	34	24
East South Central	116	179	116	42	105	54	47	36	12	18
West South Central	27	17	17	10	14	7	10	10	3	10
Mountain	122	582	122	247	174	176	209	159	70	115
Pacific	182	482	123	310	125	164	[6] 54	105	[6] 41	63

SCARLET FEVER CASE RATES

	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug 2, 1930	Aug. 8, 1931	Aug. 9, 1930
98 cities	79	71	70	53	53	49	[2] 47	38	[3] 47	31
New England	142	73	149	65	111	73	82	60	43	46
Middle Atlantic	89	49	64	35	56	34	52	21	51	20
East North Central	90	114	111	86	69	76	[4] 53	50	60	45
West North Central	44	85	42	43	29	31	31	48	[5] 21	27
South Atlantic	49	68	34	48	38	40	41	44	33	20
East South Central	52	42	23	18	6	48	35	6	41	12
West South Central	34	35	34	21	44	45	20	52	41	35
Mountain	52	88	26	79	0	26	61	62	61	70
Pacific	49	43	12	49	12	38	[6] 16	34	[6] 26	38

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] South Bend, Ind., and San Francisco, Calif., not included.
[3] St. Paul, Minn., and San Francisco, Calif., not included.
[4] South Bend, Ind., not included.
[5] St. Paul, Minn., not included.
[6] San Francisco, Calif., not included.

Summary of weekly reports from cities, July 5 to Aug. 8, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930
98 cities	2	7	3	6	3	7	[2] 2	4	[3] 3	3
New England	2	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	1	9	4	10	2	8	[4] 1	2	2	6
West North Central	4	10	4	14	10	21	11	12	[5] 15	6
South Atlantic	4	0	0	4	0	2	2	4	2	2
East South Central	6	18	0	0	6	18	6	0	0	0
West South Central	10	7	7	7	0	3	3	14	0	7
Mountain	0	9	0	18	0	18	0	0	9	0
Pacific	8	36	22	18	20	22	[6] 5	22	[6] 18	4

TYPHOID FEVER CASE RATES

	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930
98 cities	14	16	13	16	16	18	[2] 27	18	[3] 22	17
New England	2	5	12	10	10	7	12	7	14	5
Middle Atlantic	8	10	7	4	8	7	13	5	16	10
East North Central	5	6	6	9	5	13	[4] 11	12	10	11
West North Central	19	10	2	23	19	48	31	23	[5] 21	19
South Atlantic	28	60	47	44	69	42	77	52	53	66
East South Central	58	84	35	60	47	66	64	108	29	60
West South Central	81	35	57	59	10	38	169	42	95	14
Mountain	35	0	26	26	0	18	17	26	44	35
Pacific	6	14	6	16	27	10	[6] 5	16	[6] 18	10

INFLUENZA DEATH RATES

	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930
91 cities	3	3	2	2	1	2	[2] 3	1	[3] 2	3
New England	2	0	0	0	0	0	2	0	2	0
Middle Atlantic	4	4	0	3	1	1	4	0	3	2
East North Central	2	3	4	2	2	3	[4] 2	1	1	1
West North Central	0	6	3	0	0	3	0	0	[5] 0	3
South Atlantic	4	2	4	0	2	4	6	6	0	10
East South Central	6	13	0	0	0	0	13	0	13	0
West South Central	7	7	3	11	3	11	0	0	3	0
Mountain	0	0	0	9	0	0	0	0	0	18
Pacific	0	2	0	5	2	2	[6] 7	2	[6] 7	5

PNEUMONIA DEATH RATES

	July 11, 1931	July 12, 1930	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930
91 cities	59	53	47	43	44	56	[2] 49	52	[3] 48	52
New England	79	44	50	39	31	44	41	41	34	46
Middle Atlantic	59	54	61	54	55	68	59	59	52	56
East North Central	47	37	32	32	32	38	[4] 30	43	35	47
West North Central	88	75	71	39	53	57	47	48	[5] 52	45
South Atlantic	71	60	39	54	43	86	65	66	79	72
East South Central	50	71	44	52	44	91	50	52	63	45
West South Central	86	78	45	46	52	71	59	75	62	53
Mountain	61	106	35	53	17	79	44	62	44	70
Pacific	31	50	24	15	43	7	[6] 51	35	[6] 34	35

[2] South Bend, Ind., and San Francisco, Calif., not included.
[3] St. Paul, Minn., and San Francisco, Calif., not included.
[4] South Bend, Ind., not included.
[5] St. Paul, Minn., not included.
[6] San Francisco, Calif., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended August 1, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended August 1, 1931, as follows:

Province	Cerebrospinal fever	Dysentery	Lethargic encephalitis	Typhoid fever	Influenza	Poliomyelitis	Smallpox
Prince Edward Island [1]							
Nova Scotia					1		
New Brunswick				2			
Quebec	1			25	1	1	
Ontario			1	22		1	2
Manitoba				5			
Saskatchewan				6			11
Alberta				1			
British Columbia		8		2			
Total	1	8	1	63	2	2	13

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended August 8, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 8, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	14	Poliomyelitis	11
Diphtheria	25	Scarlet fever	23
Erysipelas	3	Tuberculosis (pulmonary)	48
German measles	1	Typhoid fever	16
Measles	29	Whooping cough	11
Mumps	1		

VIRGIN ISLANDS

Communicable diseases—July, 1931.—During the month of July, 1931, cases of certain communicable diseases were reported in the Virigin Islands as follows:

St. Thomas and St. John:	Cases	St. Croix:	Cases
Gonorrhea	1	Dengue	17
Syphilis	2	Tetanus	1
Tuberculosis, chronic pulmonary	1	Whooping cough	1

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15
Ceylon: Colombo	C			1					1	1										
	D								1	1										
China:																				
Canton	C				1			2				1								
	D							1												
Shanghai	C														P					
Swatow	C										3	1	6	7						
Tientsin	C								1		2	8								
	D								1			1								
India	C	15,334	11,544	8,968	11,462	3,212	3,013	3,505	3,784	3,932	4,657	1,687								
	D	8,123	6,131	4,550	5,767	1,806	1,598	1,845	2,021	2,116	2,656	2,704								
Bombay	C	21			2										1	11	11			
	D	9			1											6	10			
Calcutta	C	121	170	436	310	72	89	49	55	91	74	50	74	72	62	55	48			
	D	86	112	256	176	39	44	34	32	57	47	26	38	35	31	58	28			
Karikal	C		9	12	19	10		1	1											
	D		8	12	14	5		1	1											
Madras	C	99	72	20	26	18	23	11		3	6			2	2					
	D	47	29	10	13	6	8	2	1		4									
Moulmein	C															1				
	D															1				
Negapatam	D	3	3																	
Rangoon	C								2		2		2		1	2	1			
	D	1							1		1		1			1				
Tuticorin	C	1	1																	
Vizagapatam	C												1							
India (French):																				
Chandernagor	C	1	5	7	6	3		1			1	2		1	1	1				
	D	1	5	6	5	3		1			1	2			1					
Pondicherry	C	19	100	100	24	3	8	2	4	1	1	1						1		
	D	11	34	18	4		3		4	1	1	1						1		
Indo-China (see also table below):																				
Cochin-China—Rachgia	C																	P		
Pnompenh	C	4	9		2					1					1	4				
	D	2	5	1	1	2				1					1	1				

Saigon and Cholon	C	6	4	5	27	25	23	34	22	18	16	14	13	8	3	3				
	D	3	4	5	22	20	18	25	13	9	14	9	9	3	2	2				
Iraq: Basra	C																	3	9	263
	D																	2	8	140
Persia: Rafsanjan [1]	C					31	1	4												
	D					12		2												
Philippine Islands: [2]																				
Iloilo	C	2																		
	D	2																		
Provinces—																				
Capiz	C	59	186	48	29	11	3		3	4										
	D	47	146	41	21	11	3		1	4										
Cebu	C																		1	1
	D																		1	1
Iloilo	C	145	95	7						8	7	5	6	24	3					
	D	110	65	4						6	5	6	4	22	3					
Masbate	C			21																
	D			9																
Negros, Occidental	C	90	4										2							
	D	56	4										1							
Negros, Oriental	C	1																		
	D	1																		
Pampanga	C					1														
Siam	C	3	1	10	16	11	2	1			1	3		1	1					
	D	1		2	4	3	1	1			1	1			1					
Ayudhaya District	C			1																
Bangkok	C	3	2	3	3	1	1	1					1	1			3			
	D	1	1	2	2			1					1				2			
Bismulok Province	C			8																
	D			2																
On vessel:																				
S. S. Arankola, at Rangoon from Calcutta	C								1											
S. S. City of Eastborne, at Calcutta from Cocanada	C									1										
S. S. Tairea, at Penang from Calcutta	C										1									

Place		December, 1930	January, 1931	February, 1931	March, 1931			April, 1931			May, 1931			June, 1931	
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (French) (see also table above):															
Cambodia [3]	C	28	62	125	14		65	36	22			44	40	83	96
Cochin-China [1]	C	8	24	29	39	33	33	22	40		1	52	75	71	69

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	May 16	May 23	May 30	June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11	July 18	July 25	August, 1931: 1	Aug. 8
Algeria:																			
Algiers	C	2	1	1													2		
	D			1															
Bone	C	1								1									
Constantine, vicinity of	C	1	1																
	D	1																	
Philippeville	C																		1
	D																		1
Argentina:																			
Cordoba Province	C	1	2																
Entre Rios Province—Diamante	C		2																
Jujuy Province—Palpala	C	1	1												P	P			
San Juan Province	C																		
Santa Fe	C		2																
Belgian Congo	C			2							1								
	D			2							1								
British East Africa (see also table below):																			
Tanganyika	C		22	8	18	17	5	7	17	4	7	5							
	D		4	1	21	11	2	8	9	2	4	1							
Uganda	C	25	15	19	35	11	33	31	63		91	106	101						
	D	24	15	19	32	11	26	28	61		87	100	99						
Ceylon: Colombo	C	8	11	8	4	1	1		1		1		1				1	4	
	D	6	13	7	3	1	1		1		1		1				1	4	
Plague infected rats		2	3	4	1			5										1	
China: Amoy [1]	C					1													
	D					1													
Dutch East Indies:																			
Batavia and West Java	C	180	141	84	74	18	12	14	15	15	25	11	15						
	D	168	128	80	71	18	12	14	15	15	25	11	15						
East Java and Madura	C	4	1	4	1	1													
	D	4	1	4	1	1													
Java and Madura	D	427	376	277	243	47	41	46	42	41	58	48	45	59	55				

Egypt:																			
Alexandria	C	1	2	1								3	1	1	1	2	9	4	3
	D											3	1	1			4	1	2
Plague-infected rats		1	1																
Assiout	C	20	41	13	32	4	5	8	1	4		5	2						
	D	6	11	6	17	2	4	1					1						
Beni-Suef	C	1			12	3		2											
	D	1			3	1		2											
Beheira	C																	1	
Cairo	C			1															
Dakahlia	C															1			2
Deirout	C	21	16		3	7	1		2	3									
	D	4	4		1	2	2			1									
Gharbieh	C	1									1								
	D	1									1								
Girga	C	1		80	44	1	1		5					1					
	D	1		24	22	1	1												
Kena	C			5	3			1											
	D			2	1			1											
Manfalut	C	30	15	17															
	D	6	5	3															
Minieh	C	2		3	1	5		1		3				10		2			
	D	1		2		2		1		1				2		1	1		
Port Said	C										1	1	1	1	1	2	1		
	D							1				1	1	1					
Hawaii Territory:																			
Hawaii—Hamakua—Plague-infected rats								1											
Maui Island—Kula District	C																	1	
	D																	1	
India	C	5,335	5,457	9,139	6,142	434	139	130	49	39	24	9							
	D	3,422	3,661	7,037	5,109	385	143	131	33	25	14	2							
Bassein	C	4	1		1			1						1			3		
	D	3	1		1			1						1			2		
Bombay	C	1	1	4	11	5	1	1	1					1					
	D	1	1	3	11	4	1	1											
Plague-infected rats		34	32	70	137	26	30	17	21	10	10	10	7	11	16	9	12		
Calcutta	C				2														
	D				2														
Madras Presidency	C	312	74	23	3	1	1				1								
	D	182	46	21	2		1				1								
Rangoon	C	2		1	1	1			1		1					2			
	D	1		1	1	1			1		1					1			
Plague-infected rats		4	8	7	4	1	1	3	2		3			1	2	2	1		
Indo-China (see also table below): Pnompenh	C	7	1							1		1							
	D	7	4	6	4					1		1							
Iraq:																			
Baghdad	C	5	3	8	23	7	10	4	2	10	6	1	6	1	1				
	D	4	2	5	8	3	4	2		1	4	1	3	1					
Maudhan	C								2										
Madagascar (see also table below): Tamatave	C	9																1	

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	May 16	May 23	May 30	June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11	July 18	July 25	August, 1931: 1	Aug. 8
Morocco	C	13																	
	D	4																	
Nigeria: Lagos	C	1			5														
	D	1			5														
Plague-infected rats					6														
Peru (see table below).																			
Senegal (see table below).																			
Siam	C	4	13	31	1	1			1	1									
	D	2	14	7	1	1			1	1									
Bangkok	C	8	6	29															
	D	8	5	6															
Nagara Rajsima	C	9	7	1															
	D	10	6																
Syria: Beirut	C	1	1												1		1		
Tripolitania	C	8	1																
	D	3																	
Tunisia: Tunis	C	1	14	10	16	7		8	1		8	2	1						
	D		7	4	8	3					1								
Union of Socialist Soviet Republics:																			
Gouranduz	D	28																	
Transcaucasia—Karabakh	C	6																	
Union of South Africa:																			
Cape Province	C				3														
Orange Free State	C	P	1	6	2			1	1										
	D		1	1	2				2										

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
British East Africa (see also table above):							
Kenya	C	69	21	7	345	245	154
Indo-China (see also table above)	C			4	2		2
Madagascar (see also table above):							
Ambositra Province	C	100	92	70	30		
	D	96	88	66	29		
Antisirabe Province	C	66	84	83	48		
	D	57	79	74	47		
Miarinarivo Province	C	28	31	19	6		
	D	26	29	19	6		
Moramanga Province	C	7	7	1			
	D	5	7	1			
Tananarive Province	C	92	145	90	41		
	D	89	139	81	40		

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
Peru	C	29	12				
	D	8	6				
Senegal:							
Baol [1]	C					4	
	D					3	
Dakar [1]	C				2	63	64
	D				1	49	56
Louga [1]	C			14	1	5	
	D			6		2	
Rufisque [1]	C		2			1	2
Thies [1]	C						12
	D						3
Tivaouane [1]	C				4	19	3
	D					11	2

[1] Reports incomplete.

SMALLPOX

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931			May, 1931					June, 1931				July, 1931		
					11	18	25	2	9	16	23	30	6	13	20	27	4	11	18
Algeria:																			
Algiers	C	1	1	2		2					1			7	1				1
Bone	C	1																	
Constantine	C			1					1								1		
Arabia: Aden	C	1	1																
Belgian Congo	C	50								7	10	30							
Belgium	C		1																
Bolivia.[1]																			
Brazil: Porto Alegre (alastrim)	C	3	7	49	20	19	8	6	2	4	7	6	2	3			9		
	D		1	1									1						
British East Africa: Tanganyika	C	70	91	8						13					1	6	37		
	D	5	13	3													7		
British South Africa: Southern Rhodesia	C	13												1					

[1] An epidemic of smallpox was reported on May 13 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931: 11	April 18	April 25	May, 1931: 2	May 9	May 16	May 23	May 30	June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11	July 18
Canada:																				
Alberta	C	7	1																	
British Columbia	C	2	8																	
Manitoba	C	1	1						4											
Winnipeg	C		1																	
Nova Scotia	C	1		1																
Ontario	C	40	29	9	4		6	7	17	5		3		4	3	14	3	6	12
Kingston	C	1	1				2	3												
North Bay	C		1																	
Ottawa	C	3	1												1					
Sault Ste. Marie	C	30	2		3	1				1										
Toronto	C			2		4			1						1					
Quebec	C	2															1			
Saskatchewan	C	38	63	58	5	16	3	22	7	15	18	8	7	16	18	13		13	10
Regina	C		1	2			2		2											
Canary Islands: Las Palmas	C			1																
Chile:																				
Antofagasta	C																1			
Chanaral	C											1								
China:																				
Amoy	C			1				2	2	1	1	2	1	2		1	1	1	
	D			1				1	1		1	1	1	1		1	1	1	
Canton	C		3	7	1	2	1				1	2			1		1		
Foochow	C	P	P	P	P			P				P		P					
Hankow	C																1		
Hong Kong	C	1	9	2		1	2					1							
	D		3	2			1		1			1							
Manchuria—																				
Harbin	C	1	4	2					1	1		1							
Kwantung—Dairen	C			2			1	1	1			1	1						
Nanking	C	P	P	P	P	P	P	P	P	P	P								
Shanghai—																				
Foreigners only	C	12	16	6	2	1	2	2	1	4	1	1	2	6	2	1	2	1	
Including natives	D	13	14	10	2	7	4	5	1		3	3	1	5	4	3	2	1	2

Swatow	D	7	13	20	2														
Tientsin	C	1							2									2	
Chosen (see table below).																			
Colombia: Cali	D								1										
Dutch East Indies:																			
Batavia and West Java	C	29	2	1						1	1								
	D	2	1																
East Java and Madura	C											1							
Finland	C					1													
France (see table below).																			
Great Britain:																			
England and Wales	C	958	745	795	177	163	212	192	186	166	111	107	83	94	62	48	56	45	50
Bradford	C	4	1	2	1		1	4	1	3	1	3			5				
Leeds	C			1		1	1		1		1								
London	C	140	98	147	51	39	84	53	66	44	37	36	25	59	31	16	21	9	12
London and Great Towns	C	693	683	544	142	126	162	128	139	108	84	72	57	84	49	38	53	33	
	D		1		1		1						1				1		
Sheffield	C	3	82	10	4	2	1												
Stoke-on-Trent	C	1	1																
Greece (see table below).																			
Honduras:																			
Amapala	C		1																
Ocotepeque and Gracias districts	C		P																
Puerto Castilla	C	11	3																
Tegucigalpa	C						1												
Tela	C				1														
India	C	9,623	12,222	11,791	3,950	3,740	3,468	3,068	3,422	2,836	2,477	2,668	2,170	1,856	1,622				
	D	2,245	2,600	2,261	807	681	680	752	709	572	538	530	465	474	376				
Bassein	C											1							
Bombay	C	7	6	10	2	2	1	3	2		6	1		2	1	3		1	3
	D	1	3	4	1			4	1	1	1	1		1	1	3		1	3
Calcutta	C	143	251	283	101	60	61	65	24	30	19	16	14	19	14		11	6	2
	D	100	188	203	78	42	50	54	18	25	17	15	12	18	11		9	4	3
Cochin	C	29	59	46	10	11	12	6	3										
	D		3																
Karachi	C	3	4	4		5		1							2				
	D	2		2											1				
Madras	C	16	8	22	12	4	1	2	1	3	3	1			1	1		2	
	D		1	3	2	1	1	1		1	5					1			
Moulmein	C	2																	
Negapatam	C				1	1		1							2	1			
Rangoon	C		4	3	2	2	1	6	7	5		1		1	4	1	2		1
	D			1				1	2	1	1	1		1		1	1		
Vizagapatam	C	1	8	2	2	2	4	2			5	1	2	1		3	2		2
	D		2	1	1		1				1			1		1	1		
India (French):																			
Chandernagor	C	9	12	14	8	1	4	2	8		4				1		2		1
	D	1	1	2	3	1	2	1	3		2						2		
Karikal	C	5	19	8		1	1	2	1	1	1	1	1	2		3	1	1	1
	D	4	18			1		2	1	1	1	1	1	2		3	1	1	1
Pondicherry Province	C	45	19	14	8			3	1	2	7	1	3	2	1	1	4	1	
	D	45	19	14	3	3		3	1	2	7	1	3	2	1	1	4	1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931			May, 1931					June, 1931				July, 1931		
					11	18	25	2	9	16	23	30	6	13	20	27	4	11	18
India (Portuguese)	C	5	14	8		19	2				3								
	D		3	3		4	2				1								
Indo-China (see also table below):																			
Pnompenh	C	1		1							1		2						
	D	1									1								
Saigon and Cholon	C	6	4	8	1					1		1					1		
	D	4	1	8	1					1							1		
Iraq:																			
Baghdad	C		9				1	1			1	2		1					
	D											2							
Basra	C											2		1					
Mosul Liwa	C	3	5																1
	D		1																
Ivory Coast (see table below).																			
Japan:																			
Kobe	C		2																
Nagoya	C																		1
Taiwan	C	1																	
Mexico (see also table below):	C																		
Jalisco (State)—Guadalajara	D	1		1				1	1		1			1			1	1	
Mexico City and surrounding territory	C		23	33	17	9	11	6	4	10	10	21	5	4	16		12	5	4
	D	1	8	22	4	6	4		4	3	2	2	4	3	6		4	3	1
Monterrey	C												1						
Torreon	C					1				1					1	2			
	D					2									1	1			
Vera Cruz	C		3	2		1		1	1										
Morocco (see table below).																			
Nigeria: Lagos	C			2															
Panama Canal Zone	C	2																	
Poland	C		1									3	1	1		1		17	
Portugal: Lisbon	C	103	40	52	8	18	11	19	19	14	16	18	5	17	12	14	15	12	18
Rumania (see table below).																			
Siam	C	4	2				1				3	3			4	1		1	
	D											1				1			
Spain	C	P	P	P														5	7
Straits Settlements	C	7	2	4	1		9					2							
	D	1	1	1	1	1	3					2							

Sudan (Anglo-Egyptian)	C	11	97	8				3		3		1							
	D	7	10	2								1							
Sudan (French) (see table below).																			
Syria (see table below).																			
Tunisia: Tunis	C	8		4															
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P		P	P									
Orange Free State	C	P	P	P	P	P	P		P	P	P	P	P	P					
Transvaal	C	P	P	P															
Upper Volta	C		18	3		3			1	2		85	11		1				
	D			1								1							
On vessel:																			
S. S. Clan Mactoggart at Suez	C		2																
S. S. Matheran at Suez from Calcutta	C	1																	
S. S. Clan Buchanan at Suez	C		2																
S. S. Rotterdam at Naples from Venice	C			1															
S. S. Clan McTavish at Manila from Chittagong	C					1													
S. S. Benvenue at Sydney from Shanghai	C	1																	
S. S. Clan MacBrayne at Cochin	C		1																
S. S. Chilka at Rangoon	C		1																
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C							1											
S. S. Talodi at Suakin	C									1									

Place		December, 1930	January, 1931	February, 1931			March, 1931			April, 1931			May, 1931			June, 1931	
				1-10	11-20	21-28	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	61	141	95	46	27	125		139	100	42			17	41	30	16
Ivory Coast	C	9															
Sudan (French)	C	139					4		P								
	D	20															
Syria: Beirut	C		1														1

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen	C		1		11		1
	D		1		3		
France	C		4	16	15		
Greece	C	4		4			3
Mexico (see also table above)	D	1		3		1	1

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Morocco	C	25		4	6	7	49
Rumania	C				1		1
Turkey	C	116	63	37	1		9
	D	9	7	6			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Week ended— April, 1931			May, 1931					June, 1931				July, 1931		
					11	18	25	2	9	16	23	30	6	13	20	27	4	11	18
Algeria:																			
Algiers	C		2	3			2	1	3		1	3	4	4		1			1
Constantine Department	C	31	4	3	2		6	1	8	3	5	6	6	3	1	16	2		1
Oran	C	3	1				1					2	2						
Australia, Western	C			1					1										
Bulgaria	C	13	5	9		28	4			5	8	3	11	10	6	3			
	D			2		3				1		3	2	1	1	2			
Chile: Valparaiso	D		1																
China:																			
Canton	C	2		1															
Manchuria—Harbin	C	3	5	3			8								1	2			
Shanghai	C	2																	
Tientsin	C				1	1													
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C					1								1	1		1		
Beheira Province	C				3	1													
	D				2														
Cairo	C	1																	
Port Said	C	1																	
Eritrea: Asmara	C			1															
Great Britain: Scotland	C	1																	
Fife County	C											1							
Glasgow	C	2																	
	D	1																	
Greece (see table below).																			
Guatemala.[1]																			
Iraq: Baghdad	C		5	2					2										
	D		1						2										
Irish Free State:																			
Cork County—																			
Schull	C																	1	
Skibbereen	C													1		1	1		

Kerry County—																			
Dingle	C								1										
Listowel	C															1			
Limerick County—																			
Limerick	C																2		
Michelstown	C																1		
Mayo County—Belmullet	C					1													
Japan	C															1			
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico (see also table below).																			
Durango	D	1																	
Mexico City, including municipalities in Federal District	C	39	35	216	67	34	38	31	16	27	17	15	7	12	27		28	9	7
	D	34	16	84	18	7	17	14	9	7	7	10	4	4	11		4	3	2
San Luis Potosi	D		5	5	1	2					1	1						1	3
Morocco	C	8	28	7		1		12		13	29			31	42	28	37	20	24
	D	2	1					1		2	2			2	3	1	4	4	
Palestine	C	2	3	5	1	2		2	2	1	1			2	3		2		
Panama Canal Zone—Balboa	C									1	1								
Paraguay: Asuncion	D	4	1	1															
Poland	C	106	189	287	93	176	140	129	92	81	58	67		48	33	16	9	17	13
	D	8	19	15	8	7	6	7	6	4	5	3		2	1	1	2	1	1
Portugal: Oporto	C	1																	
Rumania	C	193	152	214	70				63	52	54		42	16	12	10	2	2	7
	D	16	24	16	8				10	5	3		4	7	2		2	2	1
Syria	C									1	3								
Tunisia:																			
Sbeitla, vicinity of	C			20	2			10											
	D			7															
Sfax	C			2															
Tunis	C	16	18	14	2		1	10	12	9	8			64	9		1		
	D								1	2				4					
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	1	P	P	P		P	P	P	P	P	P					
Municipality of East London	C	3		P											1				
Natal	C	P	P	1	P	P	P	P	P		P	P	P	P					
Orange Free State	C	P	P	P	P	P	P			P	P	P	P	P					
Transvaal	C	P	P	P	P	P	P		P	P	P	P	P	P					
Yugoslavia (see table below).																			

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reported an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec., 1930	Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931
Chosen: Seoul	C	1	1		3	4	
Czechoslovakia	C	24	60	26		5	
Greece	C	10	10	17	8	22	6
	D		2	2	1	3	
Latvia	C			12			
Lithuania	C	6	26	3	99	34	10
	D	3	3	1	3	5	
Mexico (see also table above)	D	85	66	83			
Turkey	C	2	17	18	15		3
Yugoslavia	C	1	20	12	10	43	14
	D	1	2		1	5	

YELLOW FEVER

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	May 16	May 23	May 30	June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11	July 18	July 25	August, 1931: 1	Aug. 8
Brazil:																			
Bahia State	C			1															
Ceara State	C	1		2	2		1			1									
	D	1			2		1												
Minas Geraes State	C			2	5	1		1											
	D			1	2	1													
Rio de Janeiro State	C		1	2			1	1											
	D		1	2															
Cambucy	C	3	2	1															
	D	3	1																
Friburgo (imported)	C	1																	
Padua	C	2	1																
	D	2																	
Sergipe State	C										1								
British Cameroons: Mamfe	C						3			1		1							
	D						2												
Colombia—Magdalena Province—near Cienaga	C															4			

Gold Coast:																			
Akuso	C													2					
	D													1					
Kintampo	C															1			
	D															1			
Tamale	C														2				
	D														2				
Wale Wale	C																	1	
	D																	1	
Ivory Coast:																			
Bobo Dioulasso	C														1				
Grand Bassam	C																	2	
Kong Circle	C															4			
Nigeria: Abakaliki	C																		1
	D																		1
Sudan (French)	C															4			
Upper Volta—Banfora	C																2		

X

UNITED STATES TREASURY DEPARTMENT

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BY THE UNITED STATES
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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 46 SEPTEMBER 4, 1931 NO. 36

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

July 19–August 15, 1931

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized in this report. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Poliomyelitis.—A considerable outbreak of poliomyelitis has been in progress for some weeks. According to daily reports of cases in New York City the epidemic has been on the decline since August 5, when the peak incidence was reached, 111 cases being reported on that day. This was slightly more than half of the incidence on the peak day in New York City in the epidemic of 1916. During the weeks ended August 15 and 22, 1931, there were 512 and 422 cases reported in New York City, as compared with 591 during the peak week ending August 8.

Of 3,936 cases of poliomyelitis reported in the United States since the first of this year, 2,899 were in the Middle Atlantic and New England States; of these 2,083 were in New York State, of which 1,825 were in New York City, and of these approximately 1,100 were in Brooklyn.

The 3,936 cases of poliomyelitis reported in the country as a whole since January 1 may be compared with 2,081 and 917 in the corresponding periods of 1930 and 1929, respectively. The year 1929 had a low incidence of poliomyelitis, but the disease was epidemic in the central and western parts of the United States in 1930. Table 1 shows the cases reported in broad geographic areas during recent weeks with corresponding data for 1930 and 1929.

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The number of States included for the various diseases are as follows: Typhoid fever, 47; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 45; diphtheria, 47; scarlet fever, 47; influenza, 39 States and New York City. The District of Columbia is counted as a State in these reports.

TABLE 1.—*Number of poliomyelitis cases reported in different geographic areas in 1931 with comparative data in 1930 and 1929*

Geographic divisions	Total Jan 1–Aug 15	Week ended—											
		Aug.			July				June				May
		15	8	1	25	18	11	4	27	20	13	6	30
All regions.													
1931	3,936	1,040	1,029	598	307	116	90	45	40	37	38	26	23
1930	2,081	256	224	221	196	213	173	120	105	70	52	41	26
1929	917	109	65	64	70	51	34	25	22	30	29	18	18
New England and Middle Atlantic.													
1931	2,899	890	919	525	253	82	56	16	15	10	8	7	5
1930	282	61	32	20	22	17	5	8	7	6	3	2	1
1929	249	40	19	19	20	14	5	7	7	9	7	4	3
East North Central:													
1931	389	95	48	40	28	17	5	13	6	4	6	1	4
1930	173	28	21	9	13	10	20	9	0	6	3	1	5
1929	141	13	11	6	3	2	5	2	2	2	5	4	5
West North Central:													
1931	179	31	24	13	7	3	4	3	2	3	6	3	3
1930	195	52	25	26	19	18	11	2	2	4	0	2	0
1929	61	2	3	4	4	1	2	1	3	5	3	2	2
South Atlantic:													
1931	133	15	12	8	6	3	10	3	7	6	4	3	1
1930	140	11	10	7	9	8	8	7	7	3	7	7	3
1929	232	37	20	25	30	19	12	6	2	5	8	2	3
South Central:													
1931	131	3	9	6	6	7	8	4	5	7	5	1	7
1930	422	47	61	54	29	50	37	16	34	15	5	11	5
1929	104	11	7	4	13	6	5	6	3	4	1	1	1
Mountain and Pacific:													
1931	205	6	17	6	7	4	7	6	5	7	9	11	3
1930	864	57	75	95	104	110	92	78	54	36	34	18	12
1929	130	6	5	6	6	9	5	3	5	5	5	5	4

Considering the situation in broad geographic areas, there were in the New England and Middle Atlantic States about the same number of cases in 1930 as in 1929, but the number of cases reported in 1931 (January 1–August 15) is nearly 12 times the number for the corresponding period of 1929.

In the East North Central States there was little excess in 1930 over 1929, but up to August 15, 1931, there have been 2.8 times as many cases as in the corresponding period of 1929.

In the South Atlantic States the number of cases reported since January 1, 1931, is less than the number reported in either 1930 or 1929, and the number reported in 1930 was less than in 1929.

In the West North Central States both 1931 and 1930 are materially above 1929, the ratios of occurrence in those years to that for the corresponding part of 1929 being 2.9 and 3.2, respectively.

In the South Central States the number of cases reported in 1931 represents only a slight excess over the corresponding part of 1929, but in 1930 there were 4.1 times as many cases as in the corresponding part of 1929.

In the Mountain and Pacific States the 1931 reports are only 1.6 times the corresponding period of 1929, but in 1930 there were 6.7 times as many cases as in 1929.

To summarize, in the New England and Middle Atlantic States the incidence of poliomyelitis was about normal in 1930, but a very sharp and considerable epidemic is in progress in 1931. In the South Central and Western regions the incidence in 1930 was considerably above normal, but there has as yet been little increase in the cases in 1931. In the North Central States poliomyelitis was somewhat above normal in both 1930 and 1931.

Table 2 shows the number of cases of poliomyelitis reported in each State during the recent weeks since the epidemic began.

TABLE 2.—*Number of poliomyelitis cases reported in recent weeks in each State*

State	Week ending—											
	Aug. 15	Aug. 8	Aug. 1	July 25	July 18	July 11	July 4	June 27	June 20	June 13	June 6	May 30
New England and Middle Atlantic:												
Maine	2	7	4	1	0	0	2	0	0	0	0	0
New Hampshire	3	0	1	0	1	0	0	0	0	0	0	0
Vermont	5	0	0	0	1	0	1	0	0	0	0	0
Massachusetts	90	67	25	16	16	6	5	5	2	2	3	1
Rhode Island	18	16	8	0	0	1	0	0	0	0	0	0
Connecticut	67	97	37	11	5	7	2	2	0	0	1	0
New York City	512	591	404	195	53	31	5	6	4	4	1	2
New York State, except New York City	88	85	29	9	4	5	0	1	2	1	0	2
New Jersey	97	55	16	14	1	3	0	1	0	0	1	0
Pennsylvania	8	1	1	7	1	3	1	0	2	1	1	0
East North Central:												
Ohio	9	5	1	1	1	0	5	2	0	1	0	2
Indiana	3	1	0	0	0	0	0	1	1	0	0	0
Illinois	26	15	15	12	3	2	4	2	0	1	0	1
Michigan	33	17	13	9	7	0	2	1	3	3	1	0
Wisconsin	24	10	11	6	6	3	2	0	0	1	0	1
West North Central:												
Minnesota	29	13	10	3	1	1	0	1	1	2	0	2
Iowa	1	3	1	1	0	0	0	0	0	0	1	0
Missouri	0	7	2	0	0	0	1	0	1	1	1	1
North Dakota	0	1	0	0	0	0	0	1	1	2	0	0
South Dakota	1	0	0	0	1	2	0	0	0	1	0	0
Nebraska	0	0	0	0	0	1	0	0	0	0	0	0
Kansas	0	0	0	3	1	0	2	0	0	0	1	0
South Atlantic:												
Delaware	0	1	0	0	0	0	0	0	0	0	0	0
Maryland	1	1	0	1	0	0	0	0	0	0	0	0
District of Columbia	1	1	1	0	0	0	0	0	0	0	0	0
Virginia	0	0	0	0	0	0	0	0	0	0	0	0
West Virginia	2	1	1	1	0	0	0	2	0	0	1	0
North Carolina	10	5	1	2	1	4	2	2	1	0	0	1
South Carolina	0	0	3	2	2	4	0	1	5	3	1	0
Georgia	1	3	1	0	0	1	1	1	0	1	1	0
Florida	0	0	1	0	0	1	0	1	0	0	0	0
East and West South Central:												
Kentucky	0	2	0	0	0	0	0	1	0	0	0	1
Tennessee	0	2	1	1	1	0	0	0	0	1	0	0
Alabama	0	0	0	1	1	4	0	1	1	1	1	0
Mississippi	1	0	1	0	2	4	0	0	3	0	0	3
Arkansas	0	0	0	0	0	0	1	0	0	1	0	0
Louisiana	0	0	1	1	0	0	1	2	0	1	0	3
Oklahoma	1	1	1	2	1	0	0	1	2	1	0	0
Texas	1	4	2	1	2	0	2	0	1	0	0	0
Mountain and Pacific:												
Montana	1	2	1	1	0	0	0	1	1	1	0	0
Idaho	0	0	0	0	0	0	0	0	0	0	0	0
Wyoming	0	0	0	0	0	0	1	0	0	0	0	0
Colorado	0	0	1	0	0	0	0	0	0	2	0	0
New Mexico	0	1	1	0	0	0	0	0	0	0	0	0
Arizona	0	1	0	0	0	0	0	0	0	0	0	0
Utah	0	0	0	0	0	0	0	0	0	0	2	0
Washington	3	4	0	2	1	1	0	0	0	1	0	0
Oregon	0	0	0	0	0	0	0	0	0	0	0	0
California	2	9	3	4	3	6	5	4	6	5	9	3

Typhoid fever.—The usual seasonal increase of typhoid fever continued through the current 4-week period. Each geographic area contributed to the increase, but the disease seemed most prevalent in States along the Atlantic coast and in the Mississippi Valley areas. For the country as a whole, the number of cases reported (3,620) very closely approximated the number recorded for the corresponding period in 1930, but was about 13 per cent higher than the figure for 1929.

Meningococcus meningitis.—An increase of about 6 per cent was noted in the number of cases of meningococcus meningitis reported for the 4-week period ended August 15 over the preceding 4-week period. The South Central group of States and States on the Pacific coast seemed mostly responsible for this increase. In the former group the number of cases increased from 27 during the 4 weeks ended July 15 to 42 during the current 4-week period. Alabama reported 18 out of the 42 cases. In the Mountain and Pacific group the number of cases increased from 16 to 27; in California the cases rose from 7 to 14. For the whole reporting area, however, the total number of cases was only 75 per cent of the cases occurring in the corresponding period in 1930 and 54 per cent of the incidence for the same period in 1929.

Scarlet fever.—The number of cases of scarlet fever reported (3,362) during the current 4-week period was about 15 per cent in excess of the number that occurred during the same period in 1930. For this period in 1929, the number of cases totaled 4,118. The New England and Middle Atlantic States showed an increase of 36 per cent over the corresponding period in 1930 and the South Central group an excess of 27 per cent over last year's figure. Other areas either equalled last year's record or showed slight decreases.

Influenza.—For the current 4-week period there were 832 cases of influenza reported, as compared with 525 for the corresponding period in 1930 and 833 cases in 1929.

Measles.—A decrease in measles of approximately 20,000 cases occurred during the 4-week period ended August 15, as compared with the preceding 4-week period. The number of cases reported (6,337) was about 15 per cent below the number reported for the corresponding period in each of the two preceding years. All areas shared in the decline except the North Central and the South Atlantic States. The former group reported a 20 per cent increase and the latter a 35 per cent increase over the same period of last year. Decreases in the various areas ranged from 9 per cent to 61 per cent.

Smallpox.—The current reported incidence of smallpox (652 cases) was less than 50 per cent of the incidence for the corresponding period in each of the years 1930 and 1929. The only region showing an excess over last year was the New England and Middle Atlantic.

There the number of cases was more than three times the number reported during the same period last year. The disease continued unusually prevalent in Vermont. Ten of the 22 cases reported from this region occurred in Vermont.

Diphtheria.—The incidence of diphtheria remained at the low level that has prevailed throughout the current year. The reported number of cases was 1,997, as compared with 2,344 in 1930 and 3,520 in 1929 in the corresponding periods. Decreases in the various geographic areas varied from 15 to 26 per cent. The South Central group alone showed an increase (42 per cent) over last year's figure for the same period.

Mortality, all causes.—The average death rate from all causes in large cities, as reported in the Weekly Health Index of the Bureau of the Census, was 10.3 per 1,000 population (annual basis) for this period, as compared with 11.0 for the corresponding period of 1930.

EXPANSION OF INVESTIGATIONS ON TICK-BORNE DISEASES BY THE UNITED STATES PUBLIC HEALTH SERVICE[1]

By R. R. SPENCER, *Surgeon, United States Public Health Service*

The recent acquisition of knowledge in the field of insect-borne diseases by workers of the United States Public Health Service brings to my mind the well-known epigram, "Knowledge is like the surface of a sphere; the larger it grows the more it comes in contact with the unknown." We are therefore permitted now to visualize new opportunities for research in medical entomology.

Before indicating what these researches might be, let us review briefly a few observations of the investigations of the Public Health Service other than those splendid contributions upon typhus and Rocky Mountain spotted fever which have been described by the preceding speakers, Doctors Dyer, Rumreich, and Badger. When all these observations are brought together and correlated they lead us inevitably to the necessity for a logical growth and expansion of our efforts in this very important subject of insect-borne diseases.

The Public Health Service has for many years conducted investigations upon Rocky Mountain spotted fever in the western United States. These investigations have been well worth while, we believe, not only because of the knowledge gained concerning Rocky Mountain spotted fever but also because of entirely unexpected observations upon other conditions.

For example, prior to 1922, tularæmia was not known to be a tick-borne disease. In that year R. R. Parker and the writer, while looking

[1] Presented at the Twenty-ninth Annual Conference of State and Territorial Health Officers with the United States Public Health Service, Washington, D. C., Apr. 28, 1931.

for spotted fever infection in wild ticks collected in the field, observed in guinea pigs, following the injection of ground-up ticks, a condition which in no way resembled spotted fever. The resemblance of the lesions in these animals to tularæmia was very striking, and when tissues and cultures were sent to Dr. Edward Francis here in Washington its identity as such was established.

As a matter of course we now know that the tick is an important, if not the most important, intermediate host responsible for the maintenance of tularæmia in nature. Experimentally, the tick is capable of holding the infection many months and can transmit the condition through the eggs to the second generation of ticks. This has not been found to be the case with deer-flies and other insects that have been used in experimentation and which are capable of transmitting tularæmia directly.

In the West human cases of tularæmia following tick bite had been occurring all the while, but had been diagnosed simply as tick fever without rash. For years past in Idaho we have found that certain physicians in the Snake River Valley had distinguished two types of tick fever—the glandular type without rash and the spotted type without glandular enlargement.

As to Rocky Mountain spotted fever investigations, it is admitted that no entirely satisfactory means for combating the disease has yet been found, although studies have been conducted from time to time for the past 30 years. However, in 1924 we developed a vaccine, or prophylactic inoculation, which has now been used for seven seasons and which we believe has a definite field of usefulness. If a steadily increasing demand for this vaccine is any indication, it is certainly the most effective weapon yet developed to use against Rocky Mountain spotted fever.

At first it was difficult to persuade people to take this vaccine, chiefly because of the unsightly material of which it is made; in the spring of 1924, when the vaccine was first prepared, no one would take it.

In 1925, on the west side of the Bitterroot River in western Montana, where our field laboratory is located, 34 people were vaccinated. All of these were among State and Public Health Service employees. In this same area we have vaccinated persons as follows:

Year	Number of persons vaccinated	Year	Number of persons vaccinated
1926	654	1929	985
1927	1,296	1930	1,597
1928	812	1931	[1] 2,000

[1] To date.

In this small area in western Montana the fatality rate among the nonvaccinated population has averaged 89 per cent over a period of 12 years. In six of these years it was 100 per cent. Since the use of the vaccine it has been reduced to 17 per cent among vaccinated persons. Among laboratory workers before the use of the vaccine the fatality rate was 100 per cent (6 cases, 6 deaths); with the use of the vaccine we have had 12 laboratory cases with but 1 death, and the 1 fatal case occurred in a patient who had received only one of the two usual doses of vaccine.

In Idaho, Wyoming, Colorado, Utah, eastern Montana, eastern Oregon, and eastern Washington, over 20,000 people have been vaccinated during the past five years. Only one case (nonfatal) has occurred in this group, and that one case was in an old man who had received only one dose. These data indicate that the vaccine confers complete protection against the mild type of the disease and greatly reduces the mortality against the highly fatal type. The duration of the immunity following vaccination is not long and varies considerably in different individuals. Vaccination each spring for several years appears to confer a better immunity.

In 1927 the Montana State Legislature appropriated $60,000 for the construction of a new laboratory at Hamilton in the Bitterroot Valley, primarily for the purpose of providing ample space for the manufacture of this vaccine and for further studies upon Rocky Mountain spotted fever. Part of this building was especially designed for the rearing of infected ticks on a huge scale, with a special feature designed to minimize the danger to the workers. In spite of these precautions all three of the men engaged in tick rearing have contracted Rocky Mountain spotted fever, but fortunately had only mild attacks and survived—due, we feel sure, to the fact that they had been previously protected by the vaccine.

The Public Health Service would gladly turn over the manufacture of this vaccine to any State or to any private institution engaged in the manufacture of biological products. Such activities are not the usual function of the Public Health Service, but we have here a new and unique situation. No State or firm would undertake this work for three reasons: (*a*) The manufacture of this vaccine is a dangerous procedure; (*b*) the process of manufacture is entirely different from that of any other vaccine and requires a highly trained and specialized personnel; (*c*) the cost of manufacture is high, while the amount of vaccine used each year is relatively small, and it would never be a commercially feasible undertaking. Therefore, the Public Health Service is forced to continue in the business of manufacturing this biologic product. In all the Western States in which spotted fever is endemic, the demand for the vaccine is increasing each year, and at the last session of Congress (71st) those States sponsored a

bill which was introduced by Senator Walsh of Montana, and which provided that the Treasury Department be authorized to purchase from the State of Montana the laboratory at Hamilton, with its equipment. An appropriation of $75,000 was authorized for the purchase of the property and an additional sum of $75,000 for constructing and equipping, on the ground so acquired, another building, for the making of alterations to the existing laboratory, and for the construction of the necessary out-buildings. This act was approved by the President, March 4, 1931.

Plans for the new building are now being drawn, and it is hoped that work will be begun this summer. In the light of past experience we expect to be able to provide much better and much safer facilities for the routine manufacture of the vaccine and to carry on extensive investigations upon Rocky Mountain spotted fever and other tick-borne diseases. In this new building provision will be made for three complete and separate research units. Each unit is planned for the use of one investigator and an attendant, and consists of a suite of three rooms—a small office, a laboratory, and an experimental animal room. Each unit will be fully equipped, so that the investigator will have his own materials and laboratory apparatus and will not be dependent on others.

The special quarters for the rearing of infected ticks, about 200,000 each year, will be so constructed that the escape of ticks through windows will be impossible. The workers must change their clothes completely upon entering. When leaving the tick-rearing rooms they are required to place their working clothes in a hot air sterilizer, take a shower bath, and search for ticks before putting on their street clothes. These precautions are taken to prevent the men from carrying infected ticks to their families or to others with whom they come in contact. Such precautions are rather troublesome, but experience has taught that they are necessary.

Having indicated some of the observations that have been made in the past six or seven years, let me briefly outline the lines of study that will be undertaken when our new laboratory at Hamilton, Mont., is completed.

1. Continued studies upon Rocky Mountain spotted fever:
   (*a*) Ways and means of improving the potency and keeping qualities of the tick vaccine.
   (*b*) Studies to determine the causes for the various degrees of virulence encountered in nature, and the relationship between the eastern and western type of the disease.
   (*c*) Studies upon the life history and habits of the rabbit tick (*Haemaphysalis leporis-palustris*), and the rôle played by this tick in the maintenance of the disease in nature. It

should be explained that the rabbit tick transmits spotted fever from rabbit to rabbit but does not infest man.

(*d*) Clinical and epidemiological studies upon human cases. Complete studies of this kind have never been made, and in some States cases are not even reported.

(*e*) A continuation of the tick parasite studies started by the Montana State Board of Entomology. This small fly is an obligate tick parasite, and its distribution throughout the affected areas may greatly reduce the number of ticks, since all ticks parasitized invariably die.

2. With reference to studies upon tick paralysis we recognize that this condition is of little public health significance, because there are so few cases each year and because the method of prevention is known. However, it is a very obscure malady. Nothing is known of the nature of the causative agent, nor of the source from which the tick obtains it. Its study has been delayed on account of the difficulty of securing ticks known to harbor the causative agent, and the finding of a suitable experimental animal.

3. Colorado tick fever is perhaps the most interesting problem of all. So far as information is available we have here an infection that is always preceded by a history of tick bite. The seasonal occurrence is coincident with the appearance of ticks in the spring of the year, and the prodromal symptoms resemble very closely those of Rocky Mountain spotted fever. It differs from spotted fever, however, in that it is rarely, if ever, fatal, produces no rash, and the sera of cases do not give a positive Weil-Felix reaction as do the sera of Rocky Mountain spotted fever and typhus fever. Does this condition represent a mild form of Rocky Mountain spotted fever, or a distinct disease entity hitherto undescribed? We do not yet know, but it should be a relatively simple matter to determine it. Until now no serious efforts have been made to study these cases clinically, epidemiologically, or from an experimental or laboratory point of view.

Finally, I believe that it may be of interest to many of you to learn that a single species of the western tick, *Dermacentor andersoni*, transmits to man by its bite not less than four diseases, namely: Rocky Mountain spotted fever, tularaemia, tick paralysis, and Colorado tick fever. Here, we believe, is a rare opportunity for those of use who are working in this field to add considerably more to our knowledge of these diseases. In so far as tick paralysis and Colorado tick fever are concerned, we are entering a practically virgin field; and in view of what has already been accomplished, and with our new facilities, we have every reason to believe that some success will attend our efforts. At least we are undertaking these studies with a great deal of hope and enthusiasm.

A SURVEY OF THE WORK OF EMPLOYEES' MUTUAL BENEFIT ASSOCIATIONS

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The work of employees' mutual benefit societies is attracting the attention of persons interested in the public health as these societies extend their usefulness by attempting to solve some of the major problems of sickness other than those occasioned by the loss of wages during periods of incapacitation. The industrial sick-benefit movement began as a substitution for "passing the hat" at times when disabling illness or accident to the breadwinner threatened to impoverish his family. Generally speaking, some form of sickness insurance has tended to supplant the time-worn custom of "taking up a collection." But in recent years certain industrial sick-benefit societies have become dissatisfied with a rôle restricted to that of a thrift organization. They have visualized possibilities for making available to members better medical attention and nursing care than the individual member ordinarily obtained, especially for hospitalization when the need for such was indicated, and even for a program aimed at the prevention of sickness. A few mutual benefit societies have thus become quasi public health agencies, and as such should be studied to determine what they have accomplished and the lines along which preventive and curative work could be most advantageously extended.

For the purpose of ascertaining to what extent the employees' mutual benefit association has gone beyond its primary function of providing a certain fraction of wages when sickness causes a suspension of earning power, to a broader program of health improvement and better care of its disabled members, and to obtain certain other facts of interest, questionnaires were sent by the National Conference on Mutual Benefit Associations [1] to all companies in the United States which were thought to have employees' organizations for sickness insurance. In all 1,500 questionnaries were mailed. The National Conference on Mutual Benefit Associations prepared the questionnaire and collected the information discussed in the present report. The work of tabulating and analyzing the statistical material was done by the Public Health Service. Up to April 1, 1931, replies had been received from 602 companies, or about 40 per cent of those addressed. Two hundred and twenty-three companies wrote that they had no form of mutual benefit association. Twenty-seven others stated that the association had been discontinued, the most frequent reason being that group life and sickness insurance policies had been taken out with insurance companies. Twenty-three other

[1] The officers of the National Conference on Mutual Benefit Associations are Harold A. Ley, chairman, and Meyer Bloomfield and Henry Bruère, vice chairmen.

companies had never had a sick-benefit society, but were now purchasing sickness insurance for their employees from life insurance companies. Fourteen companies reported that they had relief departments or sick-benefit plans operated and financed entirely by the corporation. The content of the letters from the remainder of the companies or their benefit associations, totaling 315, affords the subject matter of the present report.

WHO ANSWERED QUESTIONNAIRE

Before taking up the questions which were asked of companies having sick-benefit organizations, it appears desirable to ascertain whether the answers were given by company executives, by clerks, or by the officers of the mutual benefit associations. Among those who gave their title or position in replying to the questionnaire, 67 per cent appeared to be company executives, 13 per cent were in some clerical capacity, and 20 per cent were officers of the employee mutual benefit. About 20 per cent of the answers represented the views of the employment or personnel department, 16 per cent the president or vice president of the company, 14 per cent the company's secretary, assistant secretary, treasurer, or assistant treasurer, and 8 per cent the opinion of the general manager, the assistant manager, or the superintendent. It is apparent, therefore, that a majority of the answers should reflect the views of executives of the company rather than the opinion of the rank and file of the members or even of their officers. Inasmuch as most of the questionnaires were directed to the companies, it is to be expected that the replies would come from them rather than from the beneficial associations; nevertheless, the source of the replies should be kept in mind when considering the answers to those questions which were propounded to elicit opinions.

AGE OF MUTUAL BENEFIT ASSOCIATIONS

The average age of the 312 funds which reported their age was 21 years. The largest number of associations in any one age group was found in the 10 to 14 year old group. Two per cent were founded more than 50 years ago. It is possible, of course, that a smaller proportion of the newer associations may be represented in the replies to the questionnaires, since they may be less well known than the older organizations; but the error in this direction appears small, on account of the effort made to obtain the name and address of every mutual benefit association in the United States. It is apparent that the industrial sickness relief association in this country is not a recent development nor an untested experiment. It has survived the vicissitudes of a considerable number of years; it may be said, at least, to have passed its probationary period.

TABLE 1.—*Age of mutual benefit societies* [1]

Age in years	Number of societies	Per cent of total societies	Age in years	Number of societies	Percent of total societies
Total	315		20-24	43	14
Total for which age was reported	312	100	25-29	31	10
			30-34	29	9
Less than 5	21	7	35-39	14	4
5-9	34	11	40-44	24	8
10-14	55	18	45-49	9	3
15-19	44	14	50 and over	8	2

[1] The average age is 21 years.

SCALE OF BENEFITS AND THEIR ADEQUACY

The scale of benefits of the associations which replied to the questionnaire is, roughly, as follows: One-fourth of the benefit classes provided by the funds pay less than $7 per week; about one-half of them pay $7 to $13 ($1 to $2 per day), and one-fourth pay more than $13 per week.

Associations having more than one class of benefits were counted in each benefit class provided; therefore the unit used in Table 2 was not the fund, but the benefit class. A number of societies provide two or three classes; several have as many as 10 or 12. Quite frequently the rate of payment to female members is considerably less than the rate paid to males.

More funds provide benefits of $9–$11 per week than any other amount. This group is composed chiefly of societies paying $9 or $10 per week. Less than 10 per cent of the benefit classes pay exactly $12 per week, although that rate appeared to be rather favorably regarded, as shown in the answers to a subsequent question concerning suggested changes in the scale of benefits.

Few considered cash benefits adequate when they were less than $5 per week. About two-thirds of the benefit classes providing payments of $5 to $6.99 per week, about three-fourths paying $7 to $8.99 per week, and about five-sixths of those paying $9 to $12.99 per week stated that the benefits appeared to be sufficient. Nearly all of the funds which paid more than $15 per week reported that the rate was adequate. Attention should be called to the point that the opinions concerning adequacy of benefits were, in general, those of company executives and not of the wage-earning members.

TABLE 2.—*Number of benefit classes paying specified amounts weekly as provided by associations, classified according to maximum period for which benefits may be paid,*[1] *and per cent of classes which were regarded by the associations as adequate*

Cash benefits per week	Maximum period for which benefits may be paid at rate indicated										
	All weeks	5, 6, 7	8, 9	10	12	13	26	52	104	Other periods	Period not stated
	Number of benefit classes paying specified amounts per week for maximum period indicated										
Total	512	21	21	39	37	116	42	41	5	76	114
Less than $3	5	------	------	------	------	1	1	2	------	1	------
$3.00-$4.99	18	1	3	1	2	1	2	3	1	2	2
$5.00-$6.99	101	3	7	10	10	24	9	3	1	16	18
$7.00-$8.99	76	3	3	6	5	16	7	6	------	14	16
$9.00-$10.99	122	4	6	11	9	30	7	7	1	14	33
$11.00-$12.99	51	4	1	6	4	15	5	2	------	4	10
$13.00-$14.99	21	1	------	------	1	6	------	3	1	5	4
$15.00-$16.99	34	3	------	2	2	4	3	3	------	7	10
$17.00-$18.99	17	1	------	1	2	4	------	4	1	1	3
$19.00-$20.99	20	------	------	------	------	5	2	2	------	5	6
$21.00-$22.99	3	------	------	------	------	2	1	------	------	------	------
$23.00-$24.99	7	------	------	1	------	3	------	------	------	1	2
$25.00 and over	5	------	------	1	------	1	------	------	------	2	1
Fraction of wages:											
One-half to three-fifths	16	1	------	------	2	2	2	4	------	2	3
Two-thirds	6	------	------	------	------	1	2	1	------	------	2
Three-fourths to four-fifths	8	------	------	------	------	1	1	1	------	1	4
Full pay	2	------	1	------	------	------	------	------	------	1	------
	Per cent of benefit classes in which payments were considered adequate										
Total	81	75	94	66	63	84	78	100	------	89	83
Less than $3	------	------	------	------	------	------	------	------	------	------	------
$3.00-$4.99	50	------	100	0	0	0	------	100	------	100	50
$5.00-$6.99	68	50	83	71	60	71	40	------	------	75	69
$7.00-$8.99	74	0	100	33	60	69	75	100	------	90	85
$9.00-$10.99	83	67	100	75	78	92	80	100	------	80	79
$11.00-$12.99	85	100	------	67	60	86	75	------	------	100	100
$13.00-$14.99	89	100	------	------	0	83	100	100	------	100	100
$15.00-$16.99	91	100	------	100	50	100	100	------	------	100	89
$17.00-$18.99	100	100	------	100	100	100	------	100	------	------	100
$19.00-$20.99	93	------	------	------	------	100	100	100	------	100	83
$21.00-$22.99	100	------	------	------	------	100	------	------	------	------	------
$23.00-$24.99	100	------	------	100	------	100	------	------	------	100	100
$25.00 and over	100	------	------	100	------	100	------	------	------	100	100
Fraction of wages:											
One-half to three-fifths	100	100	------	------	100	100	100	100	------	100	100
Two-thirds	100	------	------	------	------	100	100	100	------	------	100
Three-fourths to four-fifths	80	------	------	------	------	------	------	------	------	100	75
Full pay	100	------	100	------	------	------	------	------	------	------	------

[1] Thirty-four funds continue paying benefits beyond the period indicated, but at a lower rate per week.

From Table 2 it may be seen that a wide range exists not only in the scale of benefits, but also in the maximum period for which benefits may be paid. Apparently, establishments made widely different choices in working out their plans for sickness relief. Viewing the matter superficially, one may say that it looks as if individualism of plan has prevailed oftener than was necessary, and that a moderate amount of standardization might be advantageous from several points of view.

CHANGES SUGGESTED IN THE SCALE OF BENEFITS

A majority favored no change in the scale of benefits. From the few instances in which reasons were reported for this attitude, it appears that a fairly wide discrepancy between the scale of sick benefits and the wage scale was considered desirable to prevent malingering. Several firms reported that some of their employees carried additional sickness insurance, especially through membership in fraternal organizations, so that the industrial sick benefit merely supplemented other disability insurance. One employer pointed out that the number of malingerers ordinarily was small, but that malingering was encouraged, manifestly, when sick benefits approximated or exceeded wages. It seems somewhat surprising, in view of the importance which appeared to be attached to the problem of malingering, that only two establishments suggested the payment of all medical costs of sickness with only a small weekly payment in cash to the disabled member. Three other companies suggested that the society pay at least part of the cost of hospitalization without changing the weekly rate of cash benefits.

Most of the suggestions for changes in benefits were concerned with (*a*) the amount under a single scale of dues and benefits, (*b*) the amount in proportion to wages either as a definite percentage or in classes according to wages, (*c*) the maximum period for which benefits may be paid, and (*d*) the size of the death benefit.

Under the first-mentioned plan an increase in benefits to about $12 per week ($2 per day) appeared to be most favored. An increase to $8 or $10 per week was suggested by almost as many companies, while a much smaller number advocated benefits of $15 to $20 per week.

A fairly large group of the reporting establishments appeared to favor paying benefits in proportion to wages either as a definite percentage of the wage or according to classes roughly corresponding to the principal wage groups. A ratio of benefits to wages of two-thirds or more was favored by several companies. For associations which preferred benefit classes rather than a specific proportion of the wages, scales extending from $6 or $8 to $20 or $24 per week were suggested. Several felt that additional classes should be provided in the upper range of the scale, especially for benefits between $15 and $24 per week.

Concerning suggested changes in the maximum period for which benefits are payable, two considered a reduction desirable and four favored increasing the length of the period. The reductions suggested were, specifically, from 14 to 8 and from 26 to 13 weeks, respectively, while the recommended increases were rather vague,

such as "should be more than 10 weeks in any 12 months," "more than 13 weeks," and "more than 16 weeks."

Obviously, cases occur which extend beyond the limit of the benefit period, no matter where the practical limit is placed. Perhaps for this reason one establishment suggested special provision for certain long illnesses such as those due to tuberculosis, cancer, and major operations.

Four firms suggested that the death benefit be abolished. The reason for such opinion was not reported, although a cue may be taken from the recommendation of another establishment to the effect that a fixed sum be established for burial. It appears that a tendency may be in evidence for an undue proportion of the death benefit to be spent for burial purposes.

Widely divergent were opinions on the death benefit that should be provided, ranging all the way from $50 to $2,000 or more. The death benefit was felt to be too high in at least two instances, i. e., if death was due to a nonindustrial accident, the benefit was two-thirds of a year's wages; and in death from any cause, when payable to the widow of a member, the benefit was 30 per cent of the wages, payable annually until her death or remarriage.

TABLE 3.—*Changes suggested in the scale of benefits*

	Number
Answering question	251
In favor of no change	142
Total suggestions for changes (some offered more than one suggestion)	126
Would pay part of cost of hospitalization	3
Would pay small weekly cash benefit in addition to all medical expense	2
Recommending that present benefits be increased to about—	
$5–$7 per week	6
$8–$10 per week	17
$12 per week	20
$15 per week	3
$18–$20 per week	6
Benefits should be about the same as industrial accident compensation	1
Benefits should be in proportion to wages—	
No specific scale suggested	7
About two-thirds of wages	3
Should be more than 75 per cent of wages	3
Full pay much too liberal	1
Present scale of $3 to $7.50 per week should be increased	1
Present scale of $3, $6, $9, and $12 per week should be increased	1
Present scale of $7.50, $11.25, and $15 per week should be increased	1
Scale of benefits should be $8, $12, and $16 per week	1
Scale of benefits should be $10, $15, and $20 per week	1
Scale of benefits should run from $6 to $24 per week	1
A class paying more than $9 per week should be provided	1
Total suggestions for changes—Continued.	
Benefits should be in proportion to wages—Continued.	
Classes paying $18 and $20 per week should be provided	1
Class of $17.50 or $20 should be added instead of having the highest class $15 per week	1
Scale of $5, $9, and $12 should be reduced to $4, $7.50, and $10	1
Benefits of $15 per week should be reduced among those earning less than $20 per week	1
Advances to higher classes should be compulsory when wages are increased	1
Benefits should be based upon dependency	1
Benefit period should be reduced—	
From 14 to 8 weeks	1
From 26 to 13 weeks	1
Benefit period should be extended—	
From 5 to 6 weeks	1
Beyond limit of 10 weeks in any 12 months	1
Beyond limit of 13 weeks in any 12 months	1
Beyond limit of 16 weeks in any 12 months	1
Beyond 15 weeks for tuberculosis, cancer, major operations	1
Would reduce premium	1
Would pay for the first week when disability lasts more than 7 days	1
Would abolish death benefit	4
Fixed sum should be made available for burial	1

TABLE 3.—*Changes suggested in the scale of benefits*—Continued

	Number
Total suggestions for changes—Continued.	
Death benefit should be more than—	
$50	1
$75	2
$100	2
$200	2
$500	2
$600	1
$1,000	2
$1,250	1
Death benefit should be—	
$50	1
$100	2
$200	1
Total suggestions for changes—Continued.	
Death benefit should be—Continued.	
$500	2
$500–$1,000	1
$1,000	3
$2,000	1
One year's earnings	1
Death benefit should be reduced when—	
Two-thirds of year's wages for death from nonindustrial accident	1
30 per cent of husband's wages payable annually to widow until her death or remarriage	1

OPINIONS CONCERNING IMPROVEMENT IN EMPLOYEES' HEALTH WHICH THE MUTUAL BENEFIT ASSOCIATION HELPED BRING ABOUT

That the mutual benefit association was not organized for health improvement was the statement of 5 per cent of the companies replying to the question "What improvement in employees' health has the mutual benefit work helped to bring about?" That there was no improvement, or no important health results, was the opinion of 32 per cent of the men answering this question. Another 20 per cent stated that no data were available for measuring improvement. The remainder (43 per cent) reported that improvement in health had probably resulted from the work of the sick-benefit association. The principal reasons advanced for such a belief were that the benefit society afforded machinery for obtaining early diagnosis and appropriate medical treatment; that the physical examinations conducted by the association, and especially the periodic health examination, uncovered physical defects and pathological conditions the correction of which in many instances the society had helped to finance; and that health was safeguarded through the patient's feeling of security which membership in the association engendered, resulting in more complete recuperation before a return to work was attempted.

TABLE 4.—*Opinions concerning improvement in employees' health which the mutual benefit association helped bring about*

	Number	Per cent
Answering question	227	100
Stating that benefit association was not organized for health improvement	11	5
Reporting no improvement or no important health results	74	32
Reporting no data as a basis for measuring health improvement	45	20
Believing that improvement in health has resulted from the work of the association	97	43
(a) Through machinery for obtaining early diagnosis and appropriate medical treatment of cases	31	13
(b) Through patients' feeling of security, permitting more complete recuperation before returning to work	14	6
(c) Through correction of physical defects which association helped finance or which resulted from association's physical examinations	12	5
(d) Other reasons as basis for belief in improvement	9	4
(e) Reporting improvement, but giving no reason for belief	31	14

OPINIONS CONCERNING IMPROVEMENT IN CUTTING DOWN ABSENCES DUE TO ILLNESS WHICH THE MUTUAL BENEFIT ASSOCIATION HELPED BRING ABOUT

As is to be expected, the answers concerning improvement in cutting down absences due to illness which the benefit society helped bring about arrayed themselves in a fashion not unlike the answers to the preceding question. A somewhat smaller proportion of the informants, however, stated that absences on account of illness had been reduced than stated that improvement in health had resulted from the work of the benefit association (36 as against 43 per cent).

More persons reported no important reduction in absences due to illness than stated that absences had been reduced through the work of the mutual benefit. Two organizations reported an increase in absences due to sickness, especially among persons belonging to more than one sick-benefit fund. Among those who reported reduction in absenteeism, 20 attributed it to the ability of patients to return to work sooner, because the association had been instrumental in providing proper medical service and care; and 10 ascribed the reduction to a decline in the number of unnecessary absences and malingering resulting from the work of visiting nurses or investigators.

TABLE 5.—*Opinions concerning improvement in cutting down absences due to illness which the mutual benefit association helped bring about*

	Number	Per cent
Answering question	208	100
Stating that benefit association was not organized for such purpose	9	4
Reporting that results have not been measured	38	18
Reporting no improvement, or no important reduction in absences due to illness	84	41
Reporting increase in absences due to sickness, especially when members belong also to other sick-benefit funds	2	1
Stating that absences have been reduced	75	36
(a) Through ability of patients to return to work sooner, because association has been instrumental in providing proper medical service and care	20	9
(b) Through reduction of unnecessary absences and malingering by visiting nurses or by investigators	10	5
(c) No reason given for statement	45	22

FINANCIAL CONTRIBUTION OF THE COMPANY

Thirty-seven per cent of the sick-benefit funds which answered the question in regard to financial contribution stated that the company contributed nothing. Among the 63 per cent of the funds to which the company was a contributor, the method and amount of contribution varied widely.

Two per cent of the companies confine their sick-benefit contribution to donations to found or reorganize the association. Two per cent guarantee the payment of benefits or contribute in times of emergency. Another 2 per cent assist the association in the opera-

tion of store or cafeteria and 4 per cent contribute to the extent of permitting the association's administrative work to be executed on company time. Two per cent make nominal contributions yearly and 1 per cent stated that loans are made to the association in emergencies. If these companies making more or less nominal contributions are added to the number contributing nothing, the total is found to be exactly one-half of the mutual benefit funds which replied to the question.

Seven per cent of the companies pay part or all of the administrative expense of the benefit society, and an additional 4 per cent give a substantial contribution of one kind or another in addition to meeting the expenses of administration. One of these pays the cost of the first call of the physician, a plan which may stimulate the treatment of disease in its incipiency.

Another plan of contribution, which 3 per cent of the companies follow, is the donation of a fixed sum periodically or a certain amount per member per month. Sometimes the amount is determined by certain conditions, such as the attainment of a goal in membership.

But by far the most popular plan of company contribution is payment in proportion to the amount of dues collected from the members. About one-fourth of all the firms which gave information concerning the financial contribution of the company follow such a plan. A number contribute 25 to 50 per cent of the dues paid by the members, but one-half of all the companies which follow a plan of contribution in proportion to the members' contribution match the employee's dues dollar for dollar. Ten companies pay much more than 100 per cent of the dues collected.

About 2 per cent of the companies in which there is a sick-benefit organization pay part of the cost of group life insurance and 3 per cent pay the entire cost of group life.

The great diversity in the amount and method of contribution by the company to the sickness insurance plan is perhaps the most striking characteristic revealed in Table 6.

TABLE 6.—*Financial contribution of the company*

	Number	Per cent of companies which answered question
Replying to question	304	100
Companies contributing	192	63
1. More or less nominal contributions, as noted below	39	13
(a) Permit administrative work of association on company time	12	4
(b) Guarantee sick-benefits or contribute in emergencies	7	2
(c) Sum to found or reorganize association	6	2
(d) Sum to found plus financial assistance during flu epidemic	1	
(e) Nominal contributions per year	6	2
(f) Assist association in operation of cigar stand, store, cafeteria, or entertainments	4	2
(g) Loan to association in emergencies	2	1
(h) Deductions from salary on account of tardiness of employees	1	

TABLE 6.—*Financial contribution of the company*—Continued

	Number	Per cent of companies which answered question
Companies contributing—Continued.		
2. More than nominal contribution	153	50
(a) Part or all administrative expenses of the fund	20	7
(b) All administrative expenses plus financial support or contributions in emergencies	4	2
(c) All administrative expenses plus cash contribution periodically	3	1
(d) All administrative expenses plus part or all costs of group life insurance	3	1
(e) All administrative expenses plus cost of first call of physician	1	
(f) Fixed sum or certain amount per member per month	10	3
(g) Contributing periodically as conditions require	6	2
(h) Contributing in proportion to dues collected from members	82	27
Less than 25 per cent of dues from members	3	1
25–33⅓ per cent of dues	9	3
25–33⅓ per cent of dues and cost of death benefits	2	1
25 per cent of dues and total cost of administration	1	
25 per cent of dues when surplus is below $3,000	1	
40–50 per cent of dues	9	3
50 per cent of dues and administrative expenses	1	
58–80 per cent of dues	6	2
66 per cent of dues and cost of group life insurance	1	
100 per cent of dues (dollar for dollar of employee dues)	39	13
100 per cent of dues and all costs of administration	2	1
100 per cent of dues and $500 for each death	1	
125 per cent of dues	2	
133 per cent of dues, administrative costs, and loans to association in emergencies	1	
Twice amount contributed by employees and entire cost of group life insurance	1	
Three times amount contributed by employees	1	1
Five times amount contributed by employees	2	1
(i) Part of cost of group life insurance	7	2
(j) Total cost of group life insurance	9	3
(k) Total cost of group life insurance plus sum to found association	1	
(l) Total cost of group life insurance plus payment of deficits of sick benefits	1	
(m) Contributing according to other arrangements	6	2

CONDITIONS ATTACHED TO COMPANY CONTRIBUTIONS

No conditions appeared to be attached to the contributions of about 63 per cent of the companies which contributed something to the mutual benefit organizations in their establishments. In addition, probably no conditions were attached to at least a portion of the 20 per cent of contributing companies which did not answer this question.

Among the 17 per cent which stated that conditions were attached to the contributions, no uniformity in requirements was in evidence. Conditions imposed by several companies were that the company be represented on the association's board or executive committee, that the original donation or any property loaned be returned to the company if the society dissolves, or that the company reserves the right to terminate cooperation at any time.

There was no uniformity in any of the other conditions attached to the company contributions. All but one or two, however, appeared to be reasonable requirements.

TABLE 7.—*Conditions attached to company contributions*

	Number
Reporting that company contributed	192
Not stating conditions of contribution, if any	39
No conditions attached to contribution	121
Conditions attached to contributions as noted below	32
Company representation on association's board or executive committee	8
Original donation or property loaned to be returned to company if society dissolves	8
Company reserves right to terminate cooperation at any time	5
Expenditures of association must be for legitimate purposes	2
Company to be represented at any meeting of the society with privilege of making suggestions, but to have no vote in the board	1
Association must keep a company doctor employed	1
Association must be conducted on business-like basis	1
Scale of dues and benefits must be approved by company	1
Changes in constitution or by-laws must be approved by company	1
Association must live up to by-laws	1
Size of contribution dependent upon percentage of eligible members who belong to association	1
Membership must be at least 65 per cent of eligible members, and in case of dissolution, company to receive the sum initially donated	1
Membership compulsory and affairs of association managed by company	1

CRITICISM OF THE AVERAGE MUTUAL BENEFIT SOCIETY

To the question "What is your criticism of the average mutual benefit society?," a large proportion of those who answered (48 per cent) had no unfavorable criticism to offer.

Nearly one-third of those who criticized stated that the benefits were inadequate or the benefit period was too short. More persons apparently were in agreement on this point than on any other. Surprisingly, the next largest number of criticisms was leveled at the competency of management of mutual benefit societies. Four of the 12 men making such observation signed the questionnaire as association officers, the others signing as corporation executives of one kind or another. Relating also to management was the judgment of another group of eight persons that the check up of claims tended to be inadequate. Eight others reported that the sick-benefit organization suffered from members' lack of interest, and two that it lacked active company support. All 10 who commented on lack of interest were either officers of the company or department managers.

Six reported that societies generally were not on a sound actuarial basis, and several others stated that reserve funds were insufficient to meet claims during severe epidemics. Three complained that certain corporations tended to dictate policies so that the society was virtually a *company* institution rather than a *mutual benefit* organization. Another went so far as to state that results were satisfactory only when the association was managed exclusively by the employees, and decisions for benefits were made by a committee elected by the members. Only four reported insufficient attention to sickness prevention.

TABLE 8.—*Criticism of the average mutual benefit society*

	Number
Answering question	199
Giving no specific criticism	95
Criticizing adversely, as noted below	104
1. Benefits inadequate and (or) benefit period too short	33
2. Management incompetent	12
3. Inadequate check on claims	8
4. Organization suffers from members' lack of interest	8
5. Organization suffers from company's lack of interest	2
6. Not on sound actuarial basis	6
7. Reserve fund insufficient to provide for epidemics	4
8. Scope of activity too limited	5
9. Too little attention given to sickness prevention	4
10 Membership should be compulsory to cover those most in need of sickness insurance	3
11. Employees not allowed enough leeway in operating society, tends to become *company* institution instead of *mutual benefit* association	3
12. Too much delay in payment of claims	2
13. Tendency toward malingering when injured employees draw compensation from several sources	2
14 Associations of doubtful benefit or advantage	2
15. They try to pay too much which encourages malingering	1
16 Employees do not have same feeling toward organization when part of dues is paid for them	1
17. Results satisfactory only when association is managed exclusively by the employees, and decisions for benefits made by a committee elected by the members	1
18. A fair standard difficult in deciding who shall and who shall not be entitled to benefits	1
19. Work of association tends to overlap that of medical and personnel departments	1
20. Some associations have insufficient waiting period	1
21. "Too much detail"	1
22. Associations often undertake obligations which they can not perform	1
23. Failure of company usually puts benefit society out of business	1
24. "Not enough provision for prevention of lay-offs"	1

OPINION AS TO WHAT STEPS WOULD MAKE SICK-BENEFIT SOCIETY A BETTER HEALTH AND INDUSTRIAL EFFICIENCY PROMOTER

Health promotion was not regarded as a function of an industrial sick-benefit society by six reporting funds. Two others reported complete satisfaction with the present plan of activity. There were, however, 118 suggestions for making the benefit society a better health and industrial efficiency promoter.

The largest number of suggestions related to the administration of curative and preventive medicine, especially the latter. Most favored, as judged from the number of suggestions, was the periodic health examination when followed by correction of the physical defects uncovered in the examination. A sizable proportion of the opinions were in advocacy of a health educational program, including lectures and periodic bulletins. Eleven persons felt that dues and benefits should be increased to cover more adequately the cost of necessary surgical operations, and of dental, optical, and other corrective services. Visiting-nursing service was also recommended.

Some dissatisfaction with sick-benefit association management was indicated by the suggestions for "improvement in management," for closer check-up on members receiving benefits, for more liberal policy except with malingerers, for more home visits by the visiting nurse, for greater supervision to insure adequacy of medical care, and for a paid secretary. Two associations made a plea for more friendship, good will, and personal assistance in time of distress.

Other suggestions included requiring physical examination for membership in society, a study of health, establishing a medical clinic, extending hospitalization to include member's family, consolidating various mutual benefit societies to form a city-wide organization, forming a safety and sanitation committee to improve working conditions, and creating a small-loan service to members, especially for those in need of dental or surgical attention.

TABLE 9.—*Opinions as to what steps would make benefit society a better health and industrial efficiency promoter*

	Number
Expressing an opinion	126
Reporting that health promotion is not a function of industrial sick-benefit societies	6
Expressing complete satisfaction with present plan	2
Giving specific suggestions, as noted below	118
1. Periodic health examinations and correction of physical defects	27
2. Health educational program including lectures and periodic bulletins	18
3. Curative and preventive medicine administered by benefit society, or cooperation in such work by the company medical department and the benefit society	15
4. Increase of dues and benefits to cover more adequately the cost of necessary surgical operations, dental, optical, and other corrective services	11
5. Extension of service, i. e., dental, optical, etc	1
6. Improvement in management	6
7. Closer check up on members receiving benefits	4
8. Examination for membership in society	6
9. Employment of visiting nurse	5
10. More home visits by visiting nurse	1
11. Study of health	3
12. Purchase of insurance from outside organization which provides nursing and other services	3
13. Promotion of friendship, good will, and personal assistance in time of distress	2
14. Supervision to insure adequacy of medical care	2
15. Paid secretary	2
16. Small-loan service to members, especially for those in need of dental or surgical attention	2
17. Medical clinic	1
18. Extension of hospitalization to include member's family	1
19. Safety and sanitation committee to improve working conditions	1
20. Voluntary instead of compulsory membership	1
21. Compulsory instead of voluntary membership	1
22. More liberal policy except with malingerers	1
23. Elimination of death benefit	1
24. Backing by the company	1
25. Consolidation of various mutual benefit societies to form city-wide organization	1
26. What should be done dependent upon existing relationship between company and benefit society	1

STEPS TAKEN TO KEEP DOWN THE COST OF SICKNESS AND DEATH BENEFITS

About 30 per cent of those answering the question concerning steps taken to keep down the net cost of sickness and death benefits stated that no steps had been taken. This proportion may represent an understatement, inasmuch as a number of those who did not answer the question probably had taken no steps in this direction. Those who had worked on the problem naturally would be more inclined to answer than those who had not done so.

Of those reporting that steps had been taken to reduce costs, nearly one-half (49 per cent) mentioned only general methods, such as those covered by "proper administration" or investigation and follow up of cases. Forty-two per cent indicated some form of

organization or service for the treatment and prevention of sickness as a method of reducing the net cost of sickness insurance. Services mentioned were those of visiting nurses, the work of the factory medical department, health educational work, immediate medical attention in illness and medical supervision to prevent sickness, periodic health examinations, hospitalization of cases, special attention to employees' working conditions, special physical examinations when needed, and active cooperation in safety work.

Nine per cent mentioned some restrictive policy to keep down the cost. Policies most frequently mentioned were requiring an examination of applicants for membership, and the preemployment examination by the company. Confining the membership to males, excluding pensioners, eliminating Sunday benefits, limiting sick benefits to certain specific amounts, and paying no salaries to officers of the association were also mentioned. One society stated that the payment of one-half instead of all hospital expenses had stopped a tendency of members to impose upon the association.

Although 16 per cent of the establishments reported experience with periodic health examinations, as shown in Table 12, only 3 per cent of those reporting some attempt at reducing the net cost of sickness and death benefits mentioned the health examination as a method of attaining such a goal.

TABLE 10.—*Steps taken to keep down the cost of sickness and death benefits*

	Number	Per cent
Answering question	229	
Reporting no steps taken	69	
Reducing net cost by methods noted below	160	100
1. General methods	78	49
(a) "Proper administration"	66	41
(b) Investigation and follow up	12	8
2. Organization for treatment and prevention	68	42
(a) Visiting nursing service	23	14
(b) Factory medical department	15	9
(c) Immediate medical attention in illness and medical supervision to prevent sickness	12	7
(d) Health educational work	8	5
(e) Periodic health examinations	4	3
(f) Special physical examinations when needed	2	1
(g) Cooperation in safety work	2	1
(h) Hospitalization of cases	1	1
(i) Special attention to employees' working conditions	1	1
3. Restrictive policies	14	9
(a) Examination of applicants for membership	5	3
(b) Preemployment examinations by company	3	2
(c) Confining membership to males	1	1
(d) Limiting sick benefits to certain specific amounts	1	1
(e) Excluding pensioners	1	1
(f) No salaries to officers of association	1	1
(g) Eliminating Sunday benefits	1	
(h) Paying one-half instead of all hospital expenses stopped tendency of members to impose upon association	1	

EXTENT TO WHICH THE COMPANY LOOKS TO THE MUTUAL BENEFIT FUND TO COVER THE SALARIES OF EMPLOYEES IN THE SALARIED DIVISION

Apparently, only a few companies look to the mutual benefit fund to cover the salaries of disabled employees in the salaried division. Customarily such workers receive full salary during illnesses of moderate duration. Probably not more than 2 to 3 per cent of the reporting companies could be regarded as leaning somewhat heavily on the sickness fund for benefits in lieu of salaries to incapacitated office workers. Among such companies, three paid full salaries during the waiting period only (usually the first week of disability), sick benefits being substituted for salaries from then on. These three companies, however, paid in to the fund as much as the employees contributed. Two companies which paid nothing to their associations unless the surplus was nearly exhausted, reported that they looked to the fund for 75 per cent of the salaries of employees in the salaried division. One other company, a retail store, which contributed to the sick-benefit society only if the occasion required it, paid its salaried workers only for the first two days of disability.

The answers of 28 companies were so worded it was evident that disabled salaried workers received sick benefits in addition to full salary for a certain length of time. Fourteen others reported that the company paid regular salary for a certain period, but did not state whether benefits were paid in addition to salary. Nine stated that no benefits were paid as long as salary was continued, while nine other companies paid the difference between sick benefits and regular salary. The largest group, 122, simply stated that the company did not look to the benefit fund to cover the salaries of employees in the salaried division.

TABLE 11.—*Extent to which the company looks to the mutual benefit fund to cover the salaries of employees in the salaried division*

	Number	Per cent
Answering question	250	
Answers irrelevant or indicating that question was misunderstood	51	
Reporting that salaried employees are not eligible for membership	10	
All other answers	189	100
Stating "to no extent"	122	65
Members receive sick benefits in addition to full salary for a certain period	28	15
Company pays regular salary for a certain period (information not given as to whether benefits are paid in addition to salary)	14	7
No benefits paid as long as salary is continued	9	5
Company pays the difference between sick benefits and salary	9	5
Company pays salaries during waiting period only	3	2
Company pays one-fourth salary during disability	2	1
Company pays salary only for first 2 days of disability	1	
Each case determined on its own merits	1	

EXPERIENCE WITH THE PERIODIC HEALTH EXAMINATION WHEN GIVEN UNDER THE SUPERVISION OF THE MUTUAL-BENEFIT ASSOCIATION AND WHEN UNDER THE SUPERVISION OF THE COMPANY'S MEDICAL DEPARTMENT

Accurate determination of the percentage of total associations which have had experience with the periodic health examination was not possible, because it appeared to be confused in certain instances with the preemployment examination, the examination for membership in the association, and examination for diagnostic purposes. Although the answers were studied rather carefully, a decision was frequently impossible as to whether such confusion did or did not exist. It is felt that the figure of 16 per cent which appeared to have had experience with the periodic health examination errs on the side of overstatement rather than understatement. More reliable, perhaps, is the ratio of nearly five to one in favor of supervision of the health examination by the company's medical department rather than by the mutual-benefit association. In this connection attention should be called to the position of the persons answering the questionnaire, previously referred to.

Four companies appeared to have had experience with both plans, three of which reported results as being practically the same under the supervision of either. The per cent of total companies reporting good results was also much the same under either plan of supervision.

TABLE 12.—*Experience with the periodic health examination when given under the supervision of the mutual-benefit association and when under the supervision of the company's medical department*

	Number	Per cent
Answering questionnaire	315	--------
Reporting experience with periodic health examinations	51	--------
Under supervision of company's medical department	38	75
Under supervision of benefit association	8	15
Experience under both plans of supervision	4	8
Plan of supervision not stated	1	2
Good results reported under supervision of company's medical department	16	42
Good results reported under supervision of the mutual-benefit association	4	50

OPINION, AMONG THOSE WHO HAVE NOT HAD EXPERIENCE WITH THE PERIODIC HEALTH EXAMINATION, AS TO WHETHER SUCH EXAMINATIONS SHOULD BE MADE UNDER THE SUPERVISION OF THE MUTUAL BENEFIT SOCIETY OR THE COMPANY'S MEDICAL DEPARTMENT

Among those not having experience with periodic health examinations, but who volunteered opinion as to which organization should supervise such examinations, nearly three-fourths favored the company medical department for this purpose. About 10 per cent of those favoring supervision by the company medical department signed

the questionnaire as an officer of the benefit association, while about 50 per cent of those favoring supervision by the mutual benefit society signed as an executive of the corporation. Company executives, therefore, were not unanimously in favor of having the company medical department supervise the periodic health examinations.

The advantages ascribed to supervision by the company were that all employees of the company would benefit instead of only those who belonged to the association, enforcement would be easier if the authority of the company was behind the plan, there would be less change in the administering body, and health examinations could be made a condition of employment.

About one-fourth of those expressing an opinion on the subject favored supervision by the benefit association. The reasons given were that men are more likely to respond when there is no danger of dismissal on account of physical condition, that supervision by the employees' own organization would develop a finer spirit of cooperation, that a more honest picture of conditions as they actually exist would be obtained, that the company should get some benefit from its monthly contribution to the association, and that the work could be more efficiently handled by the benefit society.

Two organizations opined that results would probably be the same either way. Among those who did not answer this question, four stated as the reason that they were not in favor of periodic health examinations.

TABLE 13.—*Opinion, among those who have not had experience with the periodic health examination, as to whether supervision of such examinations should be under the mutual benefit association or the company's medical department*

	Number	Per cent
Number expressing an opinion	84	100
1. In favor of supervision by company medical department	61	73
(a) Because all employees do not belong to mutual benefit society	3	
(b) More feasible to enforce if authority of company is behind plan	2	
(c) Because such examination could be made a condition of employment	1	
(d) Less change in administering body	1	
(e) No reason given	54	
2. In favor of supervision by benefit association	21	25
(a) Because men more likely to respond when no danger of dismissal on account of physical condition	4	
(b) Because work would be more efficiently handled by benefit association	1	
(c) Because develops finer spirit of cooperation	1	
(d) Because company should get some benefit from its monthly contribution to association	1	
(e) Much more honest picture obtained of conditions as they actually exist	1	
(f) No reason given	13	
3. Regarding results the same either way	2	2

CONCLUSIONS

From the replies received, certain general conclusions in regard to sick-benefit associations in the United States appear warranted, as follows:

1. As a time-tested organization attempting to meet the needs arising from certain contingencies in the life of the wage earner, the employees' sick-benefit association appears to have found a place for itself in many industrial and mercantile concerns. In recent years a number have gone beyond the original plan in an attempt to explore and develop new fields of service and usefulness to their members. One of these relatively untilled fields consists of organized effort to obtain accurate diagnosis followed by appropriate medical attention and nursing care, including hospitalization if needed, and to secure such in the early stages of disease so that the duration of disability may be shortened as much as possible. Another important field which the more audacious organizations are beginning to till is that of disease prevention, including (*a*) the discovery and correction of physical impairments which, if neglected, may cause disability, and (*b*) health educational activity, especially in the hygiene of living.

2. Only a small fraction of the sick-benefit funds, however, at present are venturing into new fields; as a whole they are still essentially insurance organizations, making no attempt to control either the incidence or the severity of the illnesses afflicting their members. In fulfilling their primary function of providing cash benefits they seldom err on the side of overinsurance. One-fourth of the funds pay less than $1 per day, and one-half pay from $1 to $2 per day, with $9 to $11 per week the most popular rate of benefits. The criticism most frequently expressed in the questionnaires was the inadequacy of the payment.

3. Virtually no attempt has been made to insure against the uneven costs of treatment of different diseases. A case in which radium treatment is indicated for skin cancer or in which rare skill in surgery is required, ordinarily receives no larger cash benefit than a case of whooping cough causing absence from work for the same length of time. Moreover, insurance against the uneven costs of treating different diseases would dispel the bugaboo of malingering.

4. Virtually as many industrial sick-benefit associations are purely employees' societies as are cooperative organizations of employer and employee. At least 37 per cent of the reporting funds receive no help whatsoever from the company, and an additional 13 per cent receive nominal assistance or contributions only when the fund is in financial difficulties. It seems a reasonable assumption, therefore, that a number of companies might to their profit, i. e., through improved physical conditions of their workers, substitute active company support of the work of the association for a policy of mere passive recognition.

COMPARATIVE CURRENT STATE MORTALITY STATISTICS[1]

The present report on mortality from certain causes covers, for a majority of the States included, the months January to June, 1931. For some of the States the data for all of these months are not available. The present plan is to publish about three current reports during the year, covering periods of approximately 3 months, 6 months, and 9 months, respectively, with a more complete annual summary of death rates for the calendar year at as early a date as possible in the following year. It is impossible to present data for all of the States on this basis of 3, 6, and 9 months, but each State is included in each report for as many months as possible with rates in each case for the "year to date" and comparative rates for the same period in preceding years. This arrangement makes it possible to compare the mortality of the current calendar year with the mortality of preceding years in the same State.

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of (*a*) some lack of uniformity in the method of classifying deaths according to cause, (*b*) some delayed death certificates, and (*c*) various other reasons, these preliminary rates can not be expected to agree in all instances with final rates published by the Bureau of the Census, which are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the accompanying table are intended to serve only as a current index of mortality until final figures are issued by the Bureau of the Census.

Populations used in computing rates are estimates as of July 1 of each year, based on the 1920 and 1930 censuses.

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[1] From the Office of Statistical Investigations, United States Public Health Service.

Death rates from certain causes in stated period of 1931, with comparative data for corresponding periods in preceding years

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births: Infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality (143-150)	Rates per 100,000 population (annual basis): Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31-37)	Cancer, all forms (43-49)	Diabetes (57)	Diseases of the nervous system (70-86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87-96)	Diseases of the heart (87-90)	Diseases of the respiratory system (97-107)	Pneumonia, all forms (100-101)	Diseases of the digestive system (108-127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
10 States*	Jan.-June	1931	11.8	68	35	7.4	2.0	5.4	2.7	4.1	3.1	51.6	.4	1.1	4.4	73.7	86.1	17.0	121.3	98.0	221.2	196.3	120.7	108.9	67.3	7.6	84.5
		1930	12.0	68	34	7.4	2.2	6.5	2.5	6.4	4.4	30.9	.5	1.1	7.8	79.6	82.7	17.0	125.0	93.1	221.4	194.5	122.0	106.3	75.7	12.3	91.1
Alabama	Jan.-June	1931	11.1	71	45	8.0	2.4	11.4	1.3	3.5	3.4	64.5	.8	1.5	4.2	86.0	59.6	10.2	93.3	61.3	132.3	121.8	127.3	116.8	62.9	11.4	93.4
		1930	11.7	78	47	8.5	3.0	4.3	.8	11.1	3.0	49.0	.6	.8	1.7	85.9	49.5	9.3	99.7	62.2	150.2	133.2	124.6	112.0	77.9	24.7	101.3
		1929	13.2	86	55	9.3	4.5	3.8	1.0	9.5	4.2	212.3	1.2	1.3	1.3	83.8	45.6	9.4	99.2	57.9	130.7	130.4	123.9	121.4	94.9	22.2	91.5
		1928	12.3	82	49	8.6	4.3	13.5	.3	7.4	4.7	81.8	.9	(1)	(1)	91.9	45.5	9.7	(1)	59.0	(1)	128.3	(1)	137.4	(1)	20.9	83.3
		1927	10.1	66	37	7.5	7.5	5.1	.8	15.4	3.6	34.5	.7	(1)	(1)	88.6	46.5	7.6	(1)	47.4	(1)	98.8	(1)	73.5	(1)	27.0	72.0
Arizona	Jan.	1931	16.6	182	131	13.5	2.6	15.8	(2)	5.3	10.5	84.1	(2)	2.6	18.4	346.9	39.4	7.9	113.0	57.8	165.6	128.8	349.5	247.0	81.5	15.8	63.1
		1930	16.3	132	97	4.2	8.1	(2)	2.7	8.1	10.7	43.0	(2)	2.7	56.4	351.9	51.0	13.4	145.1	61.8	163.9	159.4	314.3	233.3	86.0	37.6	37.6
		1929	14.6	119	78	3.2	13.7	(2)	(2)	5.5	(2)	11.0	(2)	2.7	11.0	316.1	41.2	(2)	79.7	96.7	142.9	131.9	112.7	74.2	235.4	151.2	44.0
California	Jan.-Mar.	1931	12.3	61	30	6.4	1.0	2.7	1.6	2.2	2.5	26.8	.9	.8	4.0	99.7	121.7	21.8	116.9	82.9	316.0	281.7	115.2	99.9	71.2	6.3	87.9
		1930	12.4	56	27	6.3	1.4	4.3	2.5	2.4	4.4	15.1	.6	1.1	5.2	110.9	117.8	27.7	123.4	89.3	310.7	238.5	115.3	100.5	73.8	10.0	87.3
		1929	13.2	71	38	5.0	1.5	.5	1.9	5.2	2.9	49.6	.5	1.6	9.9	119.8	115.1	23.0	125.5	87.3	320.6	287.0	127.7	113.5	72.6	7.5	97.5
		1928	12.8	65	36	5.8	1.4	.7	1.2	3.0	7.1	20.1	2.1	.9	2.1	117.7	116.8	19.6	123.7	86.9	297.5	255.5	122.5	109.2	69.9	8.7	100.9
Connecticut	Jan.-May	1931	11.2	61	(1)	(1)	.3	4.4	1.2	2.2	1.5	34.0	.4	.7	.9	56.4	109.2	23.4	(1)	(1)	(1)	218.7	(1)	114.1	(1)	6.1	89.8
		1930	12.2	71	(1)	(1)	.6	.2	3.3	2.6	3.6	26.1	.8	1.5	1.7	66.1	118.0	21.0	(1)	(1)	(1)	203.0	(1)	139.9	(1)	8.6	82.7
		1929	13.2	81	(1)	(1)	.5	6.1	1.4	3.3	3.8	82.3	(2)	1.5	1.7	70.5	114.3	19.0	(1)	(1)	(1)	221.7	(1)	168.6	(1)	8.8	89.3
		1928	12.5	73	(1)	(1)	.9	5.2	2.2	6.9	6.9	36.1	.6	1.5	.9	76.2	105.3	(1)	(1)	(1)	(1)	170.9	(1)	162.1	(1)	5.8	(1)
		1927	11.8	67	(1)	(1)	.8	2.2	2.0	3.8	5.0	31.9	.3	(2)	.5	78.7	107.3	(1)	(1)	(1)	(1)	199.6	(1)	119.8	(1)	8.3	(1)
Dist. of Col.	Jan.-June	1931	16.8	70	30	6.7	2.0	4.9	.8	1.2	5.7	31.1	.8	.8	9.0	118.2	136.2	31.1	171.0	113.7	387.4	321.9	222.1	194.3	94.5	7.4	155.4
		1930	15.8	68	33	10.2	1.2	(2)	2.9	4.1	3.7	7.8	(2)	.4	2.1	127.7	136.4	29.3	143.8	103.7	399.5	345.9	170.3	145.5	92.6	6.6	175.2
		1929	16.9	69	34	6.0	1.3	(2)	3.3	5.4	7.9	38.0	.4	(2)	2.1	135.9	131.0	29.2	147.7	91.4	410.6	350.9	219.5	193.7	91.0	5.8	183.2
		1928	16.1	(1)	(1)	(1)	1.7	5.9	1.7	3.4	9.2	22.3	.8	.8	.8	131.1	129.0	32.4	154.2	110.1	361.0	321.1	200.9	172.3	92.0	10.5	180.5
		1927	16.1	(1)	(1)	(1)	1.3	(2)	.8	4.3	7.3	34.5	.4	2.1	.8	140.9	128.1	20.9	171.3	118.8	349.3	309.9	181.8	155.0	90.5	5.5	197.1
Florida	Jan.-June	1931	12.7	69	35	10.3	5.8	3.2	.3	2.2	3.7	68.7	.1	.5	1.1	71.1	70.2	14.1	134.0	112.1	221.8	205.6	85.6	70.3	86.9	10.4	124.8
		1930	12.9	69	35	10.2	4.9	7.0	.3	4.0	3.7	31.0	.8	.5	.4	71.9	73.8	16.2	133.5	111.7	214.6	187.1	92.2	72.5	92.7	18.1	127.6

*The States included are Alabama, District of Columbia, Florida, Idaho, Indiana, Iowa, Maryland, Michigan, Tennessee, and Virginia.

(1) Not available.

(2) No deaths.

Death rates from certain causes in stated periods of 1931, with comparative data for corresponding periods in preceding years—Continued

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births			Rates per 100,000 population (annual basis)																				
				Infant mortality	All except malformations and early infancy	Maternal mortality (143–150)	Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31–37)	Cancer, all forms (43–49)	Diabetes (57)	Diseases of the nervous system (70–83)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87–96)	Diseases of the heart (87–90)	Diseases of the respiratory system (97–107)	Pneumonia, all forms (100–101)	Diseases of the digestive system (108–127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
Georgia	Jan.–Apr.	1931	11.3	78	(1)	11.1	4.5	3.0	1.9	3.9	4.0	98.8	.4	.5	2.7	73.4	48.0	9.8	119.8	(1)	150.2	137.6	139.3	130.1	49.6	4.8	103.4
		1930	11.9	84	(1)	10.2	3.7	7.0	1.2	7.5	3.7	63.3	1.5	.4	5.1	76.0	47.8	12.8	128.1	(1)	153.7	140.1	146.0	132.7	58.6	6.1	143.1
		1929	12.5	(1)	(1)	(1)	3.4	2.3	1.3	5.0	3.8	218.5	(1)	(1)	(1)	73.6	42.7	10.6	(1)	(1)	(1)	114.5	(1)	119.5	(1)	7.9	135.5
Hawaii	Jan.–June	1931	10.4	77	(1)	(1)	3.2	14.2	(2)	(2)	7.4	13.2	1.1	(2)	2.6	107.9	47.9	14.7	(1)	62.7	(1)	115.3	(1)	120.0	117.9	51.1	78.5
		1930	11.5	89	(1)	(1)	2.2	7.3	(2)	6.8	13.5	7.9	(2)	(2)	6.8	107.0	61.4	14.1	(1)	47.9	(1)	131.8	(1)	138.0	158.9	91.8	82.2
		1929	14.1	114	(1)	(1)	4.6	7.5	(2)	49.7	11.0	27.2	.6	(2)	36.4	112.1	67.0	12.7	(1)	52.6	(1)	131.2	(1)	190.1	195.9	121.9	(1)
		1928	12.0	(1)	(1)	(1)	6.3	2.3	1.7	2.3	14.4	15.9	(2)	(2)	4.6	127.3	62.2	5.8	(1)	61.7	(1)	114.7	(1)	172.2	142.3	77.2	(1)
Idaho	Jan.–June	1931	10.3	61	30	3.2	1.8	3.2	1.8	11.3	2.3	14.0	.9	3.2	7.7	29.3	65.9	10.8	137.6	112.8	197.1	174.1	111.4	102.9	56.8	2.3	37.0
		1930	10.0	49	22	4.7	2.7	1.8	2.3	3.6	2.3	13.1	(2)	(2)	8.6	36.2	60.1	7.7	106.7	68.7	200.2	174.5	142.9	122.5	52.4	.9	41.6
Illinois	Jan.–Feb.	1931	(1)	(1)	(1)	(1)	.8	6.4	6.6	2.3	6.3	59.3	.6	.5	3.6	62.1	(1)	(1)	(1)	(1)	(1)	(1)	(1)	144.1	(1)	(1)	(1)
		1930	(1)	(1)	(1)	(1)	1.2	1.4	7.9	2.3	13.6	19.7	.2	.8	4.3	59.5	(1)	(1)	(1)	(1)	(1)	(1)	(1)	103.9	(1)	(1)	(1)
		1929	(1)	(1)	(1)	(1)	2.0	2.8	4.9	3.0	7.4	208.9	(2)	.3	4.7	69.9	(1)	(1)	(1)	(1)	(1)	(1)	(1)	201.0	(1)	(1)	(1)
		1928	(1)	(1)	(1)	(1)	1.8	.6	2.9	3.7	10.0	(1)	(1)	(1)	1.8	68.1	(1)	(1)	(1)	(1)	(1)	(1)	(1)	128.2	(1)	(1)	(1)
Indiana	Jan.–June	1931	12.4	63	32	6.6	1.3	8.5	4.9	4.3	3.5	56.4	.5	.7	7.0	60.5	105.8	16.4	(1)	114.4	(1)	182.3	(1)	118.8	(1)	5.4	80.3
		1930	12.5	57	25	6.5	1.3	2.5	2.7	4.2	3.6	25.1	.3	.8	12.8	73.7	104.6	17.9	(1)	117.4	(1)	202.6	(1)	106.9	(1)	7.3	91.0
		1929	13.3	70	(1)	7.8	1.6	7.2	4.7	6.5	4.2	101.1	.3	.6	1.5	78.0	97.9	15.1	(1)	116.1	(1)	218.9	(1)	131.8	(1)	8.3	87.5
		1928	12.5	66	(1)	6.0	2.0	3.5	2.8	5.0	5.3	61.6	(1)	(1)	(1)	77.3	101.0	(1)	(1)	117.4	(1)	182.5	(1)	127.2	(1)	8.0	82.1
		1927	11.9	62	(1)	7.1	2.7	3.1	3.3	6.7	6.2	36.1	(1)	(1)	(1)	77.6	101.2	(1)	(1)	102.7	(1)	173.4	(1)	96.2	(1)	7.4	84.6
Iowa	Jan.–June	1931	11.2	60	27	6.1	.6	.2	2.8	2.8	1.5	43.6	.3	2.5	4.0	29.3	119.0	23.3	142.3	112.7	253.2	224.5	105.2	91.6	69.3	4.1	43.8
		1930	11.0	60	25	7.5	1.1	14.5	3.9	4.6	2.1	35.5	.1	2.8	3.8	34.3	108.6	23.2	140.9	97.0	261.2	210.4	111.3	101.8	68.2	3.0	44.3
		1929	11.2	60	25	6.3	1.3	1.6	2.7	5.0	.8	90.4	.7	1.6	2.3	35.7	110.8	19.9	140.4	101.9	268.9	323.4	95.0	77.9	62.1	3.8	55.3
		1928	10.5	60	23	6.5	1.9	(2)	2.5	3.2	2.6	54.2	.5	1.4	1.0	36.5	106.6	19.3	138.3	102.0	248.7	222.7	96.5	85.0	61.1	3.3	54.8
Kansas	Jan.–May	1931	10.5	64	32	9.8	.9	.6	1.5	1.9	2.0	55.1	.8	1.0	1.7	38.9	91.8	24.6	127.9	100.5	206.5	150.4	94.0	83.7	64.5	6.0	105.1
		1930	11.0	58	27	8.2	1.2	7.2	3.6	5.0	4.0	49.6	.4	.3	3.9	39.2	92.8	24.1	134.8	102.2	213.7	184.9	92.1	80.9	65.1	7.2	103.5
		1929	11.5	72	39	6.9	1.4	3.4	5.0	5.2	3.1	98.7	.3	.9	3.6	47.4	91.3	22.9	150.8	120.7	204.8	179.4	101.0	87.8	69.0	7.4	97.4
		1928	11.8	64	31	9.4	.4	1.2	3.6	6.3	2.6	93.0	.5	1.0	1.6	44.3	98.2	22.3	155.0	118.5	219.3	190.7	99.4	82.8	69.7	7.1	99.5
Maryland	Jan.–June	1931	14.3	76	41	6.4	1.8	10.5	2.3	5.4	2.3	36.4	.4	1.5	1.9	102.7	113.4	24.6	153.0	121.7	315.6	285.5	192.5	177.2	69.5	12.3	145.7
		1930	13.7	64	32	5.6	2.1	.6	3.3	5.4	3.1	15.7	.1	.9	2.2	111.3	110.7	23.7	148.5	110.7	299.3	264.4	168.0	151.2	67.6	12.5	162.1

Michigan	Jan.-June	1931	10.6	62	27	6.9	.8	.9	3.0	4.3	3.5	28.2	.2	.9	3.5	58.8	91.6	18.8	122.6	99.4	248.3	221.1	97.2	82.4	68.1	5.6	62.6
		1930	11.4	69	31	6.6	1.1	8.6	3.9	3.8	7.9	17.2	.4	1.2	12.4	66.1	89.7	19.0	127.8	96.1	246.8	218.0	114.2	95.2	75.1	8.4	66.2
		1929	13.0	74	38	6.7	1.4	4.8	4.6	6.5	10.9	66.4	.7	1.6	25.4	74.4	91.2	21.8	141.5	100.3	271.8	239.2	141.4	125.7	83.4	12.0	71.7
Minnesota	Jan.-May	1931	10.4	56	22	3.8	.3	.4	1.3	2.2	1.1	40.8	.6	1.2	2.0	42.8	119.1	21.5	105.7	81.2	211.7	192.2	108.5	99.9	69.1	3.7	56.2
		1930	10.2	47	18	5.5	1.0	7.1	2.5	3.4	1.5	23.0	.4	1.5	3.0	50.2	116.5	19.9	110.6	85.3	203.2	185.8	95.7	92.0	67.7	5.8	56.5
		1929	11.1	59	25	4.8	.3	5.0	3.7	6.4	2.7	79.3	.5	2.5	2.2	60.6	112.7	21.0	112.7	83.7	217.5	165.6	101.9	94.4	67.3	4.1	62.8
		1928	10.8	(1)	(1)	(1)	.6	.6	3.7	2.1	3.1	51.3	.3	2.3	1.6	63.8	113.2	23.8	(1)	(1)	(1)	161.8	(1)	92.6	(1)	(1)	65.7
Mississippi	Jan.-May	1931	10.9	(1)	(1)	(1)	3.6	.2	.4	2.7	4.2	78.6	.2	.1	2.6	85.6	47.6	8.4	(1)	82.3	(1)	105.4	(1)	94.4	(1)	5.8	91.1
		1930	11.5	(1)	(1)	(1)	3.7	2.6	.5	9.7	3.8	50.9	.7	(2)	13.0	86.0	45.6	9.2	(1)	71.1	(1)	105.8	(1)	94.7	(1)	7.0	00.6
		1929	13.1	(1)	(1)	(1)	5.0	8.7	(2)	10.3	2.9	228.8	.6	.6	.6	79.7	43.7	7.6	(1)	66.7	(1)	96.3	(1)	92.0	(1)	10.8	91.0
Nebraska	Jan.-April	1931	10.2	55	26	5.5	.4	(2)	2.8	4.8	3.1	43.8	1.1	.7	3.5	26.5	95.8	23.4	129.5	103.2	203.4	177.7	101.2	92.3	66.0	4.2	68.6
		1930	10.3	49	20	5.9	1.1	13.2	4.0	3.5	3.3	29.5	.2	.9	4.2	27.5	112.6	26.2	117.0	91.4	206.2	182.8	111.7	99.1	71.6	5.5	57.7
		1929	11.5	70	40	6.5	1.3	1.6	7.8	3.1	4.4	108.3	.2	1.1	4.4	35.7	91.3	24.8	130.9	99.7	216.9	194.5	115.9	101.7	77.1	6.4	60.0
New Jersey	Jan.-June	1931	11.3	64	(1)	5.9	.8	4.3	3.5	2.7	4.4	22.3	.2	1.1	2.3	69.5	110.7	26.5	114.3	84.8	287.0	257.1	122.1	103.3	66.6	7.3	04.0
		1930	11.4	63	(1)	6.0	.8	5.4	2.3	2.5	11.5	12.2	.2	1.0	2.0	73.9	104.5	25.9	114.7	85.0	273.2	247.9	117.7	106.8	71.0	8.9	05.6
		1929	12.6	67	(1)	5.6	.7	1.4	1.5	6.2	12.0	44.5	.4	1.5	2.8	76.5	107.8	24.6	120.2	87.8	297.4	273.2	163.4	146.5	71.9	8.5	09.5
		1928	12.4	(1)	(1)	(1)	.9	11.3	2.2	5.1	14.4	18.9	(1)	(1)	(1)	77.6	105.4	(1)	122.2	(1)	271.8	(1)	156.6	89.3	70.6	10.6	10.9
		1927	11.9	(1)	(1)	(1)	.7	.9	4.4	3.9	9.8	17.6	(1)	(1)	(1)	80.5	102.5	(1)	130.3	(1)	250.5	(1)	135.5	74.8	77.0	14.3	02.1
New York [1]	Jan.-May	1931	13.6	70	30	6.6	.5	2.0	3.8	3.4	2.2	26.1	.2	1.1	1.1	68.5	132.8	32.0	140.3	112.8	390.0	350.7	132.0	115.0	68.2	7.8	23.8
		1930	13.5	66	29	6.6	1.1	2.2	2.1	4.2	3.3	16.2	.2	.8	1.3	72.8	124.3	30.8	140.6	106.6	381.3	331.2	138.2	122.1	72.5	8.4	33.6
		1929	15.4	76	35	6.3	.7	4.6	3.2	4.8	3.4	81.3	.4	1.0	1.4	81.2	127.0	29.9	170.0	130.7	416.0	365.5	183.1	161.8	71.7	9.1	24.7
		1928	14.3	72	32	7.5	1.4	5.0	3.1	4.3	5.1	25.7	.3	1.1	.9	80.7	125.1	27.6	168.6	130.3	384.5	334.9	153.9	137.3	77.9	11.3	22.4
		1927	13.8	72	32	6.5	2.2	4.7	2.4	4.7	4.8	21.9	.3	.7	.2	85.4	124.4	26.6	160.0	120.3	355.1	306.7	143.6	122.4	76.8	11.9	23.6
N. Carolina	Jan.-May	1931	11.0	80	(1)	8.1	1.6	5.0	2.0	4.8	5.4	68.6	.3	.4	.4	74.4	(1)	(1)	(1)	(1)	(1)	(1)	(1)	137.5	(1)	6.8	(1)
		1930	12.1	82	(1)	7.5	.9	.1	1.1	9.9	5.2	42.1	.3	.7	1.1	84.6	(1)	(1)	(1)	(1)	(1)	(1)	(1)	131.1	(1)	16.0	(1)
		1929	12.8	(1)	(1)	(1)	2.2	1.1	2.0	7.5	7.0	162.2	.9	(1)	.5	87.5	(1)	(1)	(1)	(1)	(1)	(1)	(1)	128.6	(1)	14.0	(1)
		1928	11.3	(1)	(1)	(1)	1.8	33.1	1.7	7.5	6.7	52.7	.7	.9	(1)	82.7	(1)	(1)	(1)	(1)	(1)	(1)	(1)	134.8	(1)	13.0	(1)
Ohio	Jan.-June	1931	12.0	62	26	6.7	1.2	3.5	4.4	1.7	2.0	48.5	.6	1.0	2.0	67.5	105.4	21.9	141.0	116.5	271.0	237.6	119.1	107.2	61.3	4.4	79.3
		1930	12.0	60	25	6.5	1.7	5.1	2.8	3.8	3.0	26.0	.5	1.1	2.3	70.8	107.1	23.0	122.9	111.9	273.1	242.6	108.5	96.6	60.1	6.5	84.3
		1929	13.7	(1)	(1)	(1)	1.1	6.3	2.8	10.4	3.3	107.4	.6	(1)	3.3	76.0	103.6	(1)	(1)	116.3	(1)	242.2	(1)	121.8	(1)	6.2	90.2
		1928	12.7	(1)	(1)	(1)	1.1	4.9	2.6	3.2	6.0	51.3	.7	(1)	2.2	79.2	101.7	(1)	(1)	104.4	(1)	(1)	(1)	115.4	(1)	6.4	95.4
Pennsylvania	Jan.-May	1931	12.8	78	44	6.4	.8	8.1	3.7	2.5	4.0	54.2	.3	1.2	2.7	62.0	89.5	27.8	121.2	91.2	296.8	261.1	165.6	148.2	68.0	11.1	01.6
		1930	12.5	80	45	6.2	1.1	3.6	2.8	5.0	6.1	31.3	.4	.9	2.9	68.1	94.9	23.7	122.1	91.0	290.1	259.2	152.2	135.4	70.6	12.8	11.9
		1929	14.3	86	49	7.0	1.3	6.8	3.6	7.2	8.1	115.9	.4	1.4	2.7	72.7	103.0	26.0	162.1	99.2	300.7	271.6	182.5	159.9	73.9	13.8	18.8
		1928	13.6	82	45	6.5	1.1	8.0	3.8	3.9	11.4	48.6	.7	1.3	1.1	77.8	99.6	24.7	(1)	98.9	(1)	255.1	(1)	162.2	(1)	17.2	21.8
		1927	13.1	81	43	7.1	2.0	4.1	4.0	6.5	9.7	42.1	(1)	1.1	.5	80.9	97.3	21.3	(1)	95.4	(1)	245.7	(1)	145.9	(1)	17.4	17.6
S. Carolina	Jan.-June	1931	(1)	(1)	(1)	(1)	6.0	3.5	.7	5.0	2.8	114.1	1.2	1.2	3.0	68.8	44.6	10.2	(1)	(1)	280.2	(1)	(1)	134.6	(1)	(1)	25.0
		1930	(1)	(1)	(1)	(1)	9.3	.4	.2	14.9	4.5	54.8	.9	2.6	5.6	80.1	36.9	8.3	(1)	(1)	328.4	(1)	(1)	125.0	(1)	(1)	17.9
		1929	(1)	(1)	(1)	(1)	9.3	.1	.6	13.1	5.0	135.4	.6	3.1	2.8	82.8	41.5	7.7	(1)	(1)	309.7	(1)	(1)	112.3	(1)	(1)	02.2
		1928	(1)	(1)	(1)	(1)	7.7	30.9	.1	12.5	5.3	65.4	.9	3.2	1.9	90.6	44.3	9.4	(1)	(1)	300.1	(1)	(1)	142.9	(1)	(1)	08.2
		1927	(1)	(1)	(1)	(1)	15.1	3.5	(2)	10.1	3.8	25.7	1.3	3.5	1.6	92.4	39.9	7.9	(1)	(1)	293.9	(1)	(1)	127.8	(1)	(1)	94.2
So. Dakota	Jan.-March	1931	8.9	70	38	3.3	1.7	(2)	1.2	5.2	2.9	49.2	2.9	(2)	(2)	33.0	75.3	20.9	109.5	70.1	159.9	137.3	106.6	91.5	64.3	5.2	40.6
		1930	7.8	64	29	7.6	1.2	2.9	1.8	2.9	1.8	31.6	.6	(2)	(2)	35.2	68.0	20.5	76.8	46.9	137.7	114.3	85.0	73.8	48.6	7.0	53.9
		1929	10.2	82	47	7.7	2.4	3.5	4.1	3.0	.6	143.5	2.4	.6	4.7	54.3	57.3	23.6	89.2	55.5	160.0	144.7	121.0	105.1	63.8	4.7	34.8
		1928	8.9	71	34	4.9	1.8	1.8	3.0	4.7	3.0	37.8	(1)	(1)	(1)	79.1	62.5	17.7	96.2	54.9	141.1	118.6	99.7	85.0	66.1	10.6	36.0

[1] Not available.

[2] No deaths.

Death rates from certain causes in stated periods of 1931, with comparative data for corresponding periods in preceding years—Continued

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births: Infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality (143–150)	Rates per 100,000 population (annual basis): Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31–37)	Cancer, all forms (43–49)	Diabetes (57)	Diseases of the nervous system (70–86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87–96)	Diseases of the heart (87–90)	Diseases of the respiratory system (97–107)	Pneumonia, all forms (100–101)	Diseases of the digestive system (108–127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
Tennessee	Jan.–June	1931	10.8	73	48	8.3	3.3	7.0	2.4	4.2	2.7	63.6	.5	.4	6.6	110.5	54.7	10.4	98.4	61.3	131.8	116.9	126.5	115.4	61.7	9.0	67.4
		1930	11.6	76	48	9.2	4.2	7.7	1.5	6.3	3.4	47.9	.8	1.0	15.8	122.4	54.6	10.7	104.2	61.5	137.3	121.8	122.1	110.6	80.0	16.5	81.7
		1929	13.0	88	61	8.7	3.7	.5	2.4	6.7	4.2	189.7	1.0	.5	2.1	136.2	54.8	10.2	103.4	58.6	47.8	136.2	129.3	111.9	65.2	11.6	70.7
		1928	12.1	(1)	(1)	(1)	4.8	14.5	1.6	5.7	3.4	80.6	1.1	.6	.5	134.7	57.8	10.2	(1)	(1)	(1)	120.8	(1)	133.1	(1)	13.8	(1)
		1927	11.4	(1)	(1)	(1)	9.9	6.5	1.8	15.8	4.1	43.7	.5	.5	.6	140.0	(1)	(1)	(1)	(1)	(1)	(1)	(1)	99.2	(1)	22.3	(1)
Virginia	Jan.–June	1931	12.7	76	(1)	8.6	2.6	5.6	1.7	5.3	3.1	84.0	.3	.7	2.7	94.5	62.8	16.9	134.4	107.7	234.2	215.5	125.4	113.2	57.4	8.9	112.3
		1930	12.3	73	(1)	7.0	2.0	6.6	1.4	14.0	4.7	41.8	.8	1.2	3.2	91.3	62.9	15.7	132.1	100.4	217.9	197.2	119.6	104.2	72.3	18.1	112.9
		1929	13.3	83	(1)	7.8	2.7	2.5	.9	10.5	4.5	170.0	.5	1.4	1.8	98.9	63.1	11.0	136.1	96.3	214.2	194.7	105.0	92.7	63.1	12.0	102.6
West Virginia	Jan.–June	1931	9.9	(1)	(1)	5.2	4.7	2.9	1.9	7.5	3.0	58.7	.5	.3	.9	59.2	56.3	10.7	97.3	70.0	138.9	114.6	122.3	113.0	59.6	12.8	61.4
		1930	10.0	(1)	(1)	6.4	5.2	7.7	2.6	15.3	4.5	36.5	.3	.3	1.7	71.1	55.3	12.7	90.4	58.6	154.1	120.5	112.5	103.6	62.5	20.1	58.2
		1929	11.5	(1)	(1)	6.2	8.0	6.3	1.2	12.5	3.4	167.0	.7	.7	1.0	72.6	60.3	9.2	91.2	52.6	169.0	118.1	125.7	105.4	65.5	20.3	58.5
Wisconsin	Jan.–June	1931	11.0	61	(1)	5.0	.3	2.5	3.0	2.2	2.1	29.7	.3	2.0	1.8	52.3	115.8	(1)	(1)	(1)	(1)	(1)	(1)	93.0	(1)	8.0	(1)
		1930	10.8	61	(1)	5.1	.4	5.7	4.3	3.7	2.4	20.0	.3	.8	2.6	55.4	113.7	(1)	(1)	(1)	(1)	(1)	(1)	89.4	(1)	7.9	(1)
		1929	11.7	71	(1)	(1)	1.0	4.1	3.2	4.4	2.6	74.8	.4	1.9	5.7	57.5	103.2	(1)	(1)	(1)	(1)	(1)	(1)	98.7	(1)	12.7	(1)
		1928	(1)	66	(1)	(1)	.8	.6	2.9	1.9	3.6	44.7	.6	1.9	4.1	63.0	(1)	(1)	(1)	(1)	(1)	(1)	(1)	105.9	(1)	12.4	(1)

[1] Not available.

COURT DECISION RELATING TO PUBLIC HEALTH

Recovery of salary as city health officer allowed.—(Maine Supreme Judicial Court; Mahoney *v.* City of Biddeford, 155 A. 560; decided June 17, 1931.) The plaintiff brought an action to recover an amount alleged to be due him as salary as health officer of the city of Biddeford for the months of June and July, 1930. He was duly elected and qualified as health officer of the defendant city for three years beginning January 1, 1926. The applicable statute (Revised Statutes, 1930, ch. 22, sec. 8) provided that "Every city, town, and organized plantation shall employ an official who shall be known as the local health officer and who shall be appointed by the officers of the municipality subject to the approval of the State commissioner of health." In the city charter there was a provision that "All of the subordinate officers and agents shall hold the offices during the ensuing year and until others are elected and qualified in their stead unless sooner removed by the city council." Regarding this charter provision the supreme court said:

It is agreed that the health officer is a subordinate officer within the meaning of this provision, and the phrase "ensuing year" may properly be construed to mean the term for which the officer is elected.

The plaintiff had never been removed by the city council. After his term expired, two attempts were made to choose a successor. The first appointee was elected on January 7, 1929, but he did not qualify and never undertook to perform the duties of the office. The plaintiff therefore continued to act and was paid the regular salary during the next five months, and after that had been at all times ready, willing, and able to act as health officer but had been prevented by the defendant from so doing. On June 2, 1930, a second appointee was elected, but his selection was not approved by the State commissioner of health. Lacking that approval, the supreme court held that such appointee had not qualified. "Until and unless such approval is secured, he has no authority to act."

The court gave judgment for the plaintiff, saying:

In view of the provisions of the statute and city ordinance already quoted, plaintiff was, at the date of the writ, health officer of defendant city and, holding the legal title to that office, was entitled to the salary.

"The person who holds the legal title to an office is entitled to the legal right to the salary." Andrews *v.* Portland, 79 Me. 484, 10 A. 458, 10 Am. St. Rep. 280.

DEATHS DURING WEEK ENDED AUGUST 15, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended August 15, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended August 15, 1931	Corresponding week, 1930
Policies in force	74, 988, 817	75, 808, 527
Number of death claims	12, 027	13, 653
Death claims per 1,000 policies in force, annual rate	9. 0	9. 4
Death claims per 1,000 policies, first 33 weeks of year	10. 1	9. 9

Deaths[1] from all causes in certain large cities of the United States during the week ended August 15, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Aug. 15, 1931				Corresponding week, 1930		Death rate[2] for the first 33 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Total (82 cities)	6, 717	9. 8	650	[4] 51	10. 0	688	12. 5	12. 4
Akron	41	8. 3	2	20	10. 0	6	8. 1	8. 1
Albany[5]	30	12. 1	2	40	12. 2	5	14. 1	15. 3
Atlanta	73	13. 7	12	123	15. 0	15	15. 5	16. 5
White	37		9	143		10		
Colored	36	[6]	8	86	[6]	5	[6]	[6]
Baltimore[5]	180	11. 5	19	64	11. 9	6	15. 1	14. 5
White	146		16	69		3		
Colored	34	[6]	3	47	[6]	3	[6]	[6]
Birmingham	58	11. 2	4	40	13. 4	5	14. 1	14. 3
White	24		2	34		4		
Colored	34	[6]	2	49	[6]	1	[6]	[6]
Boston	168	11. 2	12	34	11 2	24	14. 6	14. 6
Bridgeport	28	9. 9	0	0	3. 6	1	11. 6	11. 5
Buffalo	106	9. 5	5	20	12. 5	12	13. 6	13. 4
Cambridge	18	8. 2	0	0	9. 6	2	12. 6	12. 3
Camden	32	14. 0	4	70	7. 9	2	11. 8	14. 1
Canton	22	10. 7	0	0	7. 4	0	10. 6	10. 4
Chicago[5]	603	9. 1	59	52	7. 6	52	11. 3	10. 7
Cincinnati	114	13. 0	10	60	14. 3	14	16. 5	16. 0
Cleveland	181	10. 3	14	41	7. 7	11	11. 6	11. 5
Columbus	63	11 6	8	78	10. 6	10	14. 2	16. 4
Dallas	59	11. 3	8		12. 1	10	11. 8	12. 1
White	45		7			8		
Colored	14	[6]	1		[6]	2	[6]	[6]
Dayton	35	8. 8	3	42	13. 2	8	12. 2	10. 5
Denver	67	12. 0	9	87	14. 8	10	14. 4	14. 9
Des Moines	15	5. 4	1	18	8. 8	3	11. 5	12. 2
Detroit	172	5. 4	25	40	6. 0	28	8. 6	9. 7
Duluth	27	13. 8	3	74	7. 2	1	11. 2	11. 4
El Paso	28	13. 9	7		18. 7	11	16. 6	18. 2
Erie	28	12. 4	1	19	13. 9	4	10. 8	11. 5
Fall River[5 7]	22	10. 0	0	0	6. 8	0	11. 8	12. 6
Flint	19	6. 0	2	26	8. 6	5	7. 3	9. 5
Fort Worth	26	8. 1	1		12. 7	3	11. 2	11. 4
White	18		0			3		
Colored	8	[6]	1		[6]	0	[6]	[6]
Grand Rapids	30	9. 1	3	44	7. 4	2	9. 4	10. 7

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended August 15, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Aug. 15, 1931				Corresponding week, 1930		Death rate [2] for the first 33 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Houston	52	8.7	6		10.4	13	11.3	12.4
White	39		5			10		
Colored	13	(6)	1		(6)	3	(6)	(6)
Indianapolis	90	12.7	7	58	12.8	5	14.3	15.1
White	79		6	56		3		
Colored	11	(6)	1	67	(6)	2	(6)	(6)
Jersey City	65	10.6	13	115	8.5	6	12.1	11.8
Kansas City, Kans.	21	8.9	1	21	7.7	0	13.3	11.4
White	17		1	25		0		
Colored	4	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo.	74	9.4	4	30	12.5	12	13.8	13.6
Knoxville	20	9.5	5	107	10.8	6	12.9	14.4
White	15		5	119		6		
Colored	5	(6)	0	0	(6)	0	(6)	(6)
Long Beach	26	8.9	0	0	11.2	1	10.1	10.1
Los Angeles	215	8.5	17	49	11.2	25	11.0	11.3
Louisville	57	9.6	7	60	15.9	6	14.7	14.2
White	43		6	59		5		
Colored	14	(6)	1	66	(6)	1	(6)	(6)
Lowell [7]	18	9.3	4	102	9.8	1	12.9	14.0
Lynn	11	5.6	1	26	6.6	3	10.2	11.1
Memphis	76	15.3	17	180	14.0	9	16.8	18.0
White	37		11	183		4		
Colored	39	(6)	6	174	(6)	5	(6)	(6)
Miami	11	5.1	0	0	9.4	0	12.1	11.6
White	7		0	0		0		
Colored	4	(6)	0	0	(6)	0	(6)	(6)
Milwaukee	99	8.8	10	43	7.4	7	9.8	9.9
Minneapolis	75	8.3	4	26	8.6	6	11.8	10.9
Nashville	54	18.1	8	119	20.3	8	17.4	17.2
White	31		5	100		7		
Colored	23	(6)	3	177	(6)	1	(6)	(6)
New Bedford [7]	14	6.5	2	53	8.3	2	12.8	11.5
New Haven	35	11.2	5	95	9.6	1	12.6	13.5
New Orleans	133	14.8	19	104	15.5	18	17.4	18.0
White	79		10	83		10		
Colored	54	(6)	9	147	(6)	8	(6)	(6)
New York	1,235	9.1	117	49	8.5	103	11.7	11.3
Bronx Borough	184	7.2	11	25	6.5	15	8.6	8.2
Brooklyn Borough	395	7.8	47	50	7.7	43	10.8	10.3
Manhattan Borough	476	13.7	42	72	12.4	40	17.8	16.9
Queens Borough	135	6.1	12	33	5.2	9	7.6	7.4
Richmond Borough	45	14.4	5	90	12.8	2	14.1	14.8
Newark, N. J.	69	8.1	8	42	8.8	12	12.1	12.6
Oakland	67	12.0	5	64	8.8	1	10.8	11.2
Oklahoma City	34	9.0	6	83	13.6	7	11.4	10.8
Omaha	47	11.3	5	56	11.7	5	14.4	14.3
Paterson	26	9.8	4	69	10.5	2	13.8	12.7
Peoria	27	13.0	4	105	12.3	3	13.2	12.9
Philadelphia	401	10.6	35	51	11.5	50	13.8	13.1
Pittsburgh	111	8.6	14	48	10.2	16	15.2	14.3
Portland, Oreg.	61	10.4	1	12	9.5	3	11.9	12.6
Providence	45	9.2	1	9	10.1	3	13.2	13.7
Richmond	45	12.7	8	117	13.7	1	16.2	15.5
White	23		3	66		1		
Colored	22	(6)	5	217	(6)	0	(6)	(6)
Rochester	61	9.6	3	27	9.8	7	12.3	11.9
St. Louis	180	11.3	15	50	14.3	17	16.1	14.9
St. Paul	55	10.4	6	62	6.3	4	11.2	10.4
Salt Lake City [5]	30	10.9	1	15	7.8	3	12.4	12.8
San Antonio	61	13.2	9		12.5	11	15.2	17.6
San Diego	33	11.0	0	0	12.2	2	13.9	14.6
San Francisco	153	12.3	7	46	10.6	6	13.2	13.2
Schenectady	23	12.5	0	0	8.7	1	10.8	11.5
Seattle	66	9.3	3	28	10.1	4	11.6	11.1
Somerville	14	6.9	1	37	5.5	1	9.4	10.2

Deaths from all causes in certain large cities of the United States during the week ended August 15, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Aug. 15, 1931				Corresponding week, 1930		Death rate [2] for the first 33 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
South Bend	5	2.4	1	25	5.5	2	8.3	9.2
Spokane	30	13.4	6	156	13.1	2	12.6	12.6
Springfield, Mass	28	9.6	2	31	9.4	1	12.3	12.6
Syracuse	38	9.3	2	24	8.2	6	12.0	12.0
Tacoma	16	7.7	0	0	12.2	1	12.4	12.9
Toledo	48	8.5	3	28	8.8	4	12.4	13.0
Trenton	33	13.9	3	52	17.7	1	17.2	17.3
Utica	29	14.8	1	26	4.6	0	14.6	15.5
Washington, D. C	128	13.5	18	100	13.9	18	16.3	15.7
White	87	-------	12	98	-------	9	-------	-------
Colored	41	(6)	6	103	(6)	9	(6)	(6)
Waterbury	15	7.8	5	151	8.9	1	9.8	10.3
Wilmington, Del.[7]	24	11.7	1	22	15.7	2	14.5	14.8
Worcester	35	9.3	3	41	7.7	1	12.8	13.3
Yonkers	23	8.6	6	157	6.9	0	8.8	8.4
Youngstown	27	8.1	2	28	7.9	2	10.7	10.5

1 Deaths of nonresidents are included. Stillbirths are excluded.
2 These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
3 Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
4 Data for 77 cities.
5 Deaths for week ended Friday.
6 For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
7 Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 22, 1931, and August 23, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 22, 1931, and August 23, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930	Week ended Aug. 22, 1931	Week ended Aug 23, 1930	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930
New England States:								
Maine	5	3			5	6	0	0
New Hampshire	1	2		8	2		0	0
Vermont	3	2			2	5	0	0
Massachusetts	31	44	1	2	29	44	2	5
Rhode Island	1	1			16		0	0
Connecticut	2	10	3		6	6	0	1
Middle Atlantic States:								
New York	39	51		[1] 4	158	70	7	9
New Jersey	13	38		1	16	35	3	4
Pennsylvania	49	37			69	91	18	12
East North Central States:								
Ohio	19	7	2	4	13	12	0	1
Indiana	8	11	4	6	1	5	3	10
Illinois	36	56	4	4	39	17	6	6
Michigan	14	17			22	37	15	2
Wisconsin	12	11	7	3	32	45	1	2
West North Central States:								
Minnesota	8	6	1	1	5	2	0	2
Iowa	4	1			2		0	1
Missouri	16	12		1	5	10	2	3
North Dakota	1	1			9		0	1
South Dakota	6	4			2	3	0	0
Nebraska	3	2			4	1	0	0
Kansas	5	9			2	4	1	5
South Atlantic States:								
Delaware		3				6	0	0
Maryland [1 2]	11	9	2	1	3	4	0	1
District of Columbia	1	3			1	8	0	1
West Virginia	7	9	2	4	21	11	0	0
North Carolina [2]	31	77		2	9	2	1	0
South Carolina	6	11	100	86	12	1	6	0
Georgia [2]	8	5	9	9		4	1	2
Florida		1	1	2		1	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 22, 1931, and August 23, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930
East South Central States:								
Kentucky	16				12		1	1
Tennessee	19	10	18	2	3	3	3	3
Alabama [2]	17	12	2	3	12	6	2	4
Mississippi	31	10					1	5
West South Central States:								
Arkansas	1	3		2	1		0	0
Louisiana	21	14	2	3			1	1
Oklahoma [3]	22	4		4	1	3	0	0
Texas [2]	15	16	2			15	1	2
Mountain States:								
Montana	1	2			6	1	1	0
Idaho	1				2	1	0	1
Wyoming					2		2	0
Colorado	5	5			2	4	0	0
New Mexico	1	5					0	2
Arizona	2	5				2	1	0
Utah [1]			6	3	8	1	0	0
Pacific States:								
Washington	8	3			6	21	3	0
Oregon	7	6	6	6	5	13	0	2
California	49	36	8	13	29	59	6	5

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930
New England States:								
Maine	7	2	7	12	0	0	4	3
New Hampshire	7	1	1	0	0	0	1	0
Vermont	7	0	4	1	8	0	0	0
Massachusetts	115	27	74	42	0	0	3	23
Rhode Island	22	1	9	2	0	0	0	0
Connecticut	115	2	10	4	0	0	0	2
Middle Atlantic States:								
New York	555	72	86	61	1	0	38	30
New Jersey	78	5	18	17	0	0	13	12
Pennsylvania	10	8	78	48	0	0	37	46
East North Central States:								
Ohio	2	13	61	40	6	8	34	47
Indiana	3	3	15	16	11	15	18	9
Illinois	36	8	60	57	8	17	26	44
Michigan	68	5	55	28	2	8	10	20
Wisconsin	26	3	17	26	0	9	5	6
West North Central States:								
Minnesota	31	12	22	7	3	3	4	7
Iowa	8	6	10	11	5	15	7	1
Missouri	3	8	11	10	1	7	18	28
North Dakota	2	2	0	3	2	1	6	2
South Dakota	0	5	8	2	4	0	1	2
Nebraska	0	4	2	4	3	2	1	3
Kansas	1	30	17	14	3	7	10	17
South Atlantic States:								
Delaware	0	0	1	1	0	0	3	6
Maryland [1, 2]	2	1	9	5	0	0	40	70
District of Columbia	2	1	6	4	0	0	2	2
West Virginia	5	0	16	8	0	2	26	39
North Carolina [2]	8	4	25	34	0	5	40	52
South Carolina	1	0	4	3	0	0	77	65
Georgia [2]	0	0	15	12	7	0	49	39
Florida	0	0	1	1	0	0	5	4

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 22, 1931, and August 23, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930	Week ended Aug. 22, 1931	Week ended Aug. 23, 1930
East South Central States:								
Kentucky	4	0	6	8	0	9	47	73
Tennessee	1	0	34	10	5	0	112	97
Alabama [2]	4	1	11	16	0	1	47	41
Mississippi	0	1	14	5	7	2	41	31
West South Central States:								
Arkansas	0	7	0	9	3	6	45	28
Louisiana	0	10	12	8	0	0	69	22
Oklahoma [3]	0	17	9	8	1	4	46	60
Texas [2]	0	4	13	10	3	3	23	32
Mountain States:								
Montana	3	0	4	6	0	1	3	2
Idaho	1	0	3	0	0	1	1	2
Wyoming	0	3	2	7	0	0	0	2
Colorado	1	1	4	6	0	1	7	8
New Mexico	1	1	4	3	0	0	0	4
Arizona	0	2	2	0	0	1	5	4
Utah [1]	0	0	1	4	0	0	1	1
Pacific States:								
Washington	3	0	15	3	3	7	7	3
Oregon	0	0	6	7	9	5	7	1
California	3	62	36	34	8	9	18	19

[1] Week ended Friday.
[2] Typhus fever: 1931, 6 cases; 1 case in Maryland; 2 cases in North Carolina; 1 case in Georgia; 1 case in Alabama; and 1 case in Texas.
[3] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July, 1931										
Colorado		27			50		1	29	7	24
Illinois	31	299	345	144	1,780	2	29	444	123	79
Louisiana	3	63	40	38	3	485	2	22	14	209
Minnesota	6	15	5	2	168	2	15	88	4	11
Missouri	10	57	1	46	102	1	4	81	28	100
New Mexico		8		16	20	5	1	3	3	16
New York	32	398		3	3,600		667	684	37	81
North Carolina	1	60	2		513	886	10	83	1	228
Oklahoma [1]	2	23	31	207	10	106	3	33	42	123
Pennsylvania	22	233		2	2,520	3	13	728	2	90
Washington	6	24	28		87		5	43	60	19
Wisconsin	7	36	28		1,073		36	125	16	23

[1] Exclusive of Oklahoma City and Tulsa.

July, 1931

	Cases
Anthrax:	
Louisiana	1
Missouri	1
Pennsylvania	2
Botulism:	
Washington (March, 1931)	2
Chicken pox:	
Colorado	51
Illinois	361
Louisiana	6
Minnesota	115
Missouri	28
New Mexico	18
New York	919
North Carolina	42
Oklahoma [1]	8
Pennsylvania	691
Washington	99
Wisconsin	504
Dysentery:	
Illinois	51
Illinois (bacillary)	7
Minnesota (amebic)	6
Missouri	2
New Mexico	2
New York	10
Oklahoma [1]	37
Enteritis:	
Washington (under 2 years)	8
Washington (over 2 years)	7
German measles:	
Colorado	3
Illinois	25
New York	233
North Carolina	50
Pennsylvania	95
Washington	6
Wisconsin	36
Hookworm disease:	
Louisiana	35
Impetigo contagiosa:	
Colorado	1
Oklahoma [1]	1
Lead poisoning:	
Illinois	5
Leprosy:	
Illinois	1
Missouri	1
Lethargic encephalitis:	
Illinois	7
Louisiana	1
Minnesota	1
New Mexico	1
New York	12
Pennsylvania	7
Washington	3
Wisconsin	2
Mumps:	
Colorado	58
Illinois	274
Louisiana	6
Missouri	37
New Mexico	25
New York	669

Mumps—Continued	Cases
Oklahoma [1]	6
Pennsylvania	639
Washington	52
Wisconsin	791
Ophthalmia neonatorum:	
Illinois	12
Missouri	3
New York	3
North Carolina	2
Oklahoma [1]	3
Pennsylvania	15
Wisconsin	1
Paratyphoid fever:	
Colorado	2
Illinois	2
Louisiana	12
New Mexico	1
New York	7
North Carolina	5
Puerperal septicemia:	
Illinois	11
New York	17
Pennsylvania	21
Washington	5
Rabies in animals:	
Illinois	16
Louisiana	3
Missouri	5
New York [2]	7
Rabies in man:	
Pennsylvania	1
Septic sore throat:	
Illinois	9
Louisiana	1
Missouri	16
New York	56
North Carolina	11
Oklahoma [1]	22
Tetanus.	
Illinois	5
Louisiana	4
Minnesota	1
Missouri	5
New York	9
Oklahoma [1]	2
Pennsylvania	9
Trachoma:	
Illinois	11
Minnesota	1
Missouri	84
Oklahoma [1]	17
Pennsylvania	2
Wisconsin	3
Trichinosis: New York	3
Tularaemia:	
Colorado	1
Illinois	1
Louisiana	1
Minnesota	1
Missouri	1
Oklahoma [1]	2
Typhus fever:	
New York	3
North Carolina	2

[1] Exclusive of Oklahoma City and Tulsa.

Undulant fever:	Cases
Colorado	24
Illinois	16
Louisiana	4
Minnesota	5
Missouri	20
New Mexico	1
New York	8
Oklahoma [1]	1
Pennsylvania	1
Washington	1
Wisconsin	6
Vincent's angina:	
Colorado	7
Illinois	1
New Mexico	1

[1] Exclusive of Oklahoma City and Tulsa.

Vincent's angina—Continued.	Cases
New York [2]	66
Oklahoma [1]	1
Whooping cough:	
Colorado	170
Illinois	1,365
Louisiana	18
Minnesota	184
Missouri	532
New Mexico	15
New York	2,029
North Carolina	734
Oklahoma [1]	49
Pennsylvania	1,468
Washington	321
Wisconsin	849

[2] Exclusive of New York City.

PLAGUE-INFECTED GROUND SQUIRRELS IN CALIFORNIA

The director of public health of the State of California reported, under date of August 17, 1931, that plague had been proved by animal inoculation in four ground squirrels from ranches in San Benito County, Calif., about 22 miles south of Hollister. The last report of plague-infected squirrels in this vicinity was dated July 31, 1931. (Public Health Reports, August 14, 1931, p. 1954.)

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 92 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,520,000. The estimated population of the 86 cities reporting deaths is more than 31,010,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended August 15, 1931, and August 16, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	553	572	
92 cities	207	187	378
Measles:			
45 States	884	738	
92 cities	246	200	
Meningococcus meningitis:			
46 States	69	101	
92 cities	32	51	
Poliomyelitis:			
46 States	1,040	303	
Scarlet fever:			
46 States	724	642	
92 cities	213	184	243
Smallpox:			
46 States	113	214	
92 cities	7	16	12
Typhoid fever:			
46 States	965	1,044	
92 cities	135	128	165
Deaths reported			
Influenza and pneumonia:			
86 cities	292	324	
Smallpox:			
86 cities	0	0	

City reports for week ended August 15, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	0		0	0	0	0
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Massachusetts:								
Boston	3	15	12	1	0	4	4	5
Fall River	0	1	2		0	1	1	0
Springfield	0	1	0		0	3	1	1
Worcester	0	2	0		0	2	5	1
Rhode Island:								
Pawtucket	0	0	0		0	0	0	0
Providence	0	3	2		0	19	2	1
Connecticut:								
Bridgeport	11	2	1		0	4	0	1
Hartford	0	1	0		0	0	0	2
New Haven	1	1	0		0	0	2	1
MIDDLE ATLANTIC								
New York:								
Buffalo	3	7	2		0	2	1	6
New York	17	93	47	2	2	41	10	79
Rochester	0	2	0		0	14	0	3
Syracuse	0	1	1		0	2	0	1
New Jersey:								
Camden	0	2	0		0	0	1	2
Newark	2	7	2	2	2	0	3	6
Trenton	0	1	0		0	0	0	4
Pennsylvania:								
Philadelphia	5	27	6		1	11	14	17
Pittsburgh	1	10	1		1	1	9	6
Reading	0	0	0		0	0	1	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	3	0		1	2	1	4
Cleveland	0	15	1	6	0	24	22	4
Columbus	1	2	2	1	1	0	4	6
Toledo	6	2	1		0	6	2	1
Indiana:								
Fort Wayne	0	1	1		0	0	0	0
Indianapolis	1	2	1		0	0	0	8
South Bend		1						
Terre Haute		0						
Illinois:								
Chicago	15	49	31	2	1	46	6	25
Springfield	4	0	0		0	0	0	1
Michigan:								
Detroit	5	23	10		0	8	1	5
Flint	0	1	1		0	3	0	2
Grand Rapids	1	1	0		0	3	0	3
Wisconsin:								
Kenosha	0	0	0		0	0	8	0
Madison	2	0	0			2	8	
Milwaukee	9	6	2	1	1	14	19	1
Racine	9	1	0		0	0	4	0
Superior	1	0	0		0	0	1	1

City reports for week ended August 15, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
WEST NORTH CENTRAL								
Minnesota:								
Duluth	1	0	0	----------	0	1	0	0
Minneapolis	2	9	7	----------	1	0	4	1
St. Paul	1	3	5	----------	0	0	1	3
Iowa.								
Davenport	0	0	1	----------	----------	0	0	----------
Des Moines	0	1	0	----------	----------	0	0	----------
Sioux City	0	0	0	----------	----------	0	0	----------
Waterloo	0	0	1	----------	----------	0	0	----------
Missouri:								
Kansas City	0	1	0	----------	0	2	2	3
St. Joseph	0	0	0	----------	0	1	0	1
St. Louis	1	13	3	----------	----------	0	1	6
North Dakota:								
Fargo	0	0	0	----------	0	0	0	0
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Sioux Falls	0	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	0	2	1	----------	0	1	0	0
Kansas:								
Topeka	2	1	1	----------	0	0	7	0
Wichita	0	0	1	----------	0	1	1	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	0	0	----------	0	1	1	3
Maryland:								
Baltimore	4	9	4	2	1	3	1	12
Cumberland	0	0	0	----------	0	0	0	1
Frederick	0	0	0	----------	0	0	0	0
District of Columbia:								
Washington	0	5	6	----------	0	1	0	4
Virginia:								
Lynchburg	0	1	0	----------	0	0	0	1
Norfolk	0	0	0	----------	0	0	0	1
Richmond	0	3	2	----------	1	0	0	0
Roanoke	0	0	1	----------	0	0	0	0
West Virginia:								
Charleston	1	0	0	----------	0	0	0	0
Wheeling	0	0	0	----------	0	0	0	1
North Carolina:								
Raleigh	----------	1	----------	----------	----------	----------	----------	----------
Wilmington	0	0	4	----------	0	0	0	0
Winston-Salem	0	1	1	----------	0	0	4	1
South Carolina:								
Charleston	0	0	0	4	0	0	0	1
Columbia	0	0	0	----------	0	0	0	1
Greenville	0	0	0	----------	0	0	0	0
Georgia:								
Atlanta	0	2	1	1	0	0	1	2
Brunswick	0	0	0	----------	0	0	0	0
Savannah	0	0	1	5	0	0	0	0
Florida:								
Miami	0	0	0	----------	0	1	1	0
Tampa	0	1	2	1	0	0	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	----------	0	----------	----------	----------	----------	----------	----------
Tennessee:								
Memphis	1	1	0	----------	1	0	0	3
Nashville	0	1	1	----------	0	2	1	2
Alabama:								
Birmingham	0	2	2	3	0	2	0	2
Mobile	0	0	0	----------	0	0	0	1
Montgomery	0	0	0	----------	----------	0	1	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	----------	0	----------	----------	----------	----------	----------	----------
Little Rock	0	0	0	----------	0	0	0	0

City reports for week ended August 15, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL—continued.								
Louisiana:								
New Orleans	0	5	6	2	2	0	0	5
Shreveport	0	0	0	----------	0	0	0	1
Oklahoma:								
Muskogee	0	0	1	----------	0	0	0	0
Oklahoma City	0	0	2	1	1	0	0	2
Texas:								
Dallas	0	4	1	----------	0	0	0	3
Fort Worth	0	1	2	----------	0	0	0	0
Galveston	0	0	0	----------	0	0	0	1
Houston	0	2	5	----------	0	0	0	2
San Antonio	0	1	2	----------	0	0	0	3
MOUNTAIN								
Montana:								
Billings	0	0	0	----------	0	4	0	0
Great Falls	1	0	1	----------	0	2	0	1
Helena	0	0	0	----------	0	0	0	0
Missoula	0	0	0	----------	0	0	0	0
Idaho:								
Boise	0	0	0	----------	0	0	0	0
Colorado:								
Denver	2	6	8	----------	1	0	8	2
Pueblo	0	1	0	----------	0	0	0	0
New Mexico:								
Albuquerque	0	0	0	----------	0	0	0	0
Arizona:								
Phoenix	0	0	0	----------	0	0	0	0
Utah:								
Salt Lake City	0	1	0	----------	0	1	1	0
Nevada:								
Reno	0	0	0	----------	1	0	0	2
PACIFIC								
Washington:								
Seattle	5	1	1	----------	----------	3	0	----------
Spokane	0	1	0	----------	----------	0	0	----------
Tacoma	1	1	0	----------	0	0	1	0
Oregon:								
Portland	5	3	0	----------	0	2	0	1
Salem	0	0	0	----------	0	0	1	0
California:								
Los Angeles	5	20	12	7	1	13	7	5
Sacramento	1	0	2	----------	0	4	0	0
San Francisco	----------	6	----------	----------	----------	----------	----------	----------

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	0	0	0	0	0	0	1	0	0	18
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	8
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	2
Massachusetts:											
Boston	15	12	0	0	0	15	3	2	0	24	168
Fall River	1	1	0	0	0	0	1	1	0	0	22
Springfield	0	1	0	0	0	0	0	1	0	2	21
Worcester	2	3	0	0	0	1	0	0	0	0	35

City reports for week ended August 15, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND—continued											
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	14
Providence	3	2	0	0	0	3	1	6	1	1	45
Connecticut:											
Bridgeport	2	0	0	0	0	3	1	0	0	4	28
Hartford	1	3	0	0	0	1	1	0	0	7	39
New Haven	0	0	0	0	0	10	1	0	0	8	35
MIDDLE ATLANTIC											
New York:											
Buffalo	5	4	0	0	0	9	1	1	0	15	102
New York	25	23	0	0	0	66	29	22	1	229	1,235
Rochester	2	10	0	0	0	4	1	0	0	3	58
Syracuse	1	2	0	0	0	2	0	1	0	16	38
New Jersey:											
Camden	1	2	0	0	0	0	0	0	0	4	32
Newark	3	3	0	0	0	7	1	3	0	93	80
Trenton	1	2	0	0	0	3	0	1	0	0	33
Pennsylvania:											
Philadelphia	14	23	0	0	0	33	32	4	0	88	401
Pittsburgh	7	1	0	0	0	7	2	0	0	54	111
Reading	0	0	0	0	0	0	0		0	3	20
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	10	0	0	0	9	2	2	0	6	114
Cleveland	9	16	0	0	0	23	3	1	1	47	181
Columbus	2	1	0	0	0	2	0	1	0	1	66
Toledo	2	1	0	0	0	4	2	0	0	20	48
Indiana:											
Fort Wayne	1	0	0	0	0	1	0	0	0	0	14
Indianapolis	2	2	1	0	0	4	0	2	1	13	-------
South Bend	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Terre Haute	0	-------	0	-------	-------	-------	1	-------	-------	-------	-------
Illinois:											
Chicago	27	24	0	0	0	48	5	2	2	154	603
Springfield	0	0	0	0	0	1	0	1	0	0	10
Michigan:											
Detroit	22	15	1	0	0	17	4	1	0	119	172
Flint	4	2	0	0	0	1	0	1	0	7	19
Grand Rapids	2	2	0	0	0	0	0	0	0	0	30
Wisconsin:											
Kenosha	1	3	0	0	0	0	0	0	0	5	6
Madison	1	0	0	0	-------	-------	0	0	-------	3	-------
Milwaukee	5	2	1	0	0	9	0	0	0	81	99
Racine	1	0	0	0	0	0	0	1	0	8	10
Superior	1	1	0	0	0	0	0	0	0	0	7
WEST NORTH CENTRAL											
Minnesota:											
Duluth	3	0	0	0	0	1	0	0	0	2	27
Minneapolis	9	3	0	0	0	3	1	0	0	3	75
St. Paul	6	2	0	0	0	2	0	3	0	12	55
Iowa:											
Davenport	0	0	0	0	-------	-------	0	0	-------	2	-------
Des Moines	2	0	0	2	-------	-------	0	0	-------	0	15
Sioux City	0	1	0	0	-------	-------	0	0	-------	4	-------
Waterloo	1	2	0	0	-------	-------	0	0	-------	3	-------
Missouri:											
Kansas City	2	1	0	0	0	1	2	1	0	11	74
St. Joseph	0	0	0	0	0	1	0	0	0	0	40
St. Louis	7	2	0	0	0	17	5	3	0	37	180
North Dakota:											
Fargo	1	0	0	2	0	0	0	0	0	18	2
Grand Forks	0	0	0	0	-------	-------	0	0	-------	0	-------
South Dakota:											
Sioux Falls	1	1	0	0	-------	-------	0	0	-------	0	10
Nebraska:											
Omaha	1	1	0	2	0	2	1	0	0	9	47
Kansas:											
Topeka	1	0	0	0	0	1	0	0	0	4	21
Wichita	1	0	0	0	0	1	0	0	0	0	18

City reports for week ended August 15, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	1	0	0	0	2	0	0	0	2	24
Maryland:											
Baltimore	4	3	0	0	0	13	7	7	1	98	180
Cumberland	0	0	0	0	0	1	1	1	0	0	20
Frederick	0	0	0	0	0	0	0	0	0	0	2
District of Col.:											
Washington	3	1	1	0	0	12	3	1	1	19	128
Virginia:											
Lynchburg	0	0	0	0	0	0	1	3	1	1	14
Norfolk	0	1	0	0	0	0	1	1	1	0	-------
Richmond	2	4	0	0	0	3	2	2	0	0	42
Roanoke	1	1	0	0	0	2	1	1	0	2	18
West Virginia:											
Charleston	0	0	0	0	0	0	2	1	0	8	17
Wheeling	1	0	0	0	0	0	0	0	0	0	11
North Carolina:											
Raleigh	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Wilmington	0	0	0	0	0	0	0	0	0	4	4
Winston-Salem	1	0	0	0	0	3	2	2	0	14	17
South Carolina:											
Charleston	0	0	0	0	0	5	2	3	1	0	26
Columbia	0	0	0	1	0	1	1	3	0	4	35
Greenville	0	1	0	0	0	0	1	0	0	1	-------
Georgia:											
Atlanta	2	1	1	0	0	5	4	12	1	3	73
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	0	0	0	0	3	0	3	0	0	28
Florida:											
Miami	0	0	0	0	0	0	0	1	0	1	11
Tampa	0	0	0	0	0	0	1	0	0	0	16
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Tennessee:											
Memphis	1	4	0	0	0	2	10	5	0	26	76
Nashville	1	0	1	0	0	2	6	2	0	3	54
Alabama:											
Birmingham	1	3	0	0	0	6	5	4	1	0	58
Mobile	0	0	0	0	0	0	1	1	1	2	18
Montgomery	0	0	0	0	-------	-------	1	0	-------	0	-------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Little Rock	0	1	0	0	0	0	1	0	0	0	-------
Louisiana:											
New Orleans	3	2	1	0	0	8	4	[1] 5	5	3	133
Shreveport	0	0	0	0	0	0	1	3	0	3	22
Oklahoma:											
Muskogee	0	1	0	0	0	0	0	1	0	0	-------
Oklahoma City	1	3	1	2	0	2	3	0	0	2	34
Texas:											
Dallas	3	1	0	0	0	4	3	4	0	13	59
Fort Worth	1	1	0	0	0	2	1	3	1	0	26
Galveston	0	0	0	0	0	3	1	0	0	0	19
Houston	1	0	0	0	0	3	1	0	0	2	52
San Antonio	1	1	0	0	0	5	1	1	0	0	61
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	1	15
Great Falls	1	0	0	0	0	0	0	0	0	0	11
Helena	0	0	0	0	0	0	0	0	0	0	4
Missoula	0	0	0	0	0	0	0	0	0	0	1

[1] 3 nonresident.

City reports for week ended August 15, 1931—Continued

Division, State, and city	Scarlet fever, Cases, estimated expectancy	Scarlet fever, Cases reported	Smallpox, Cases, estimated expectancy	Smallpox, Cases reported	Smallpox, Deaths reported	Tuberculosis, deaths reported	Typhoid fever, Cases, estimated expectancy	Typhoid fever, Cases reported	Typhoid fever, Deaths reported	Whooping cough, cases reported	Deaths, all causes
MOUNTAIN—con.											
Idaho:											
Boise	0	1	0	1	0	0	0	0	0	0	5
Colorado:											
Denver	2	2	0	0	0	5	1	0	0	16	68
Pueblo	1	0	0	0	0	0	0	3	1	0	7
New Mexico:											
Albuquerque	0	0	0	0	0	3	0	0	0	0	16
Arizona:											
Phoenix	0	0	0	0	0	0	0	0	0	0	
Utah:											
Salt Lake City	1	0	0	0	0	2	1	2	0	6	30
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	6
PACIFIC											
Washington:											
Seattle	2	1	0	1			1	0		27	
Spokane	1	0	1	0			0	0		0	
Tacoma	2	0	2	0	0	1	0	0	0	3	16
Oregon:											
Portland	2	2	3	4	0	3	1	0	0	2	61
Salem	0	0	0	1	0	0	0	0	0	5	
California:											
Los Angeles	10	4	1	0	0	22	2	1	0	34	215
Sacramento	1	0	1	0	0	2	1	3	0	1	18
San Francisco	5		2				2				

Division, State, and city	Meningococcus meningitis, Cases	Meningococcus meningitis, Deaths	Lethargic encephalitis, Cases	Lethargic encephalitis, Deaths	Pellagra, Cases	Pellagra, Deaths	Poliomyelitis (infantile paralysis), Cases estimated expectancy	Poliomyelitis, Cases	Poliomyelitis, Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	1	0	0	0	0	0	1	44	2
Fall River	0	0	0	0	1	0	0	5	1
Springfield	0	0	0	0	0	0	1	3	0
Worcester	0	0	0	0	0	0	0	1	0
Rhode Island:									
Providence	0	0	1	0	0	0	1	12	0
Connecticut:									
Bridgeport	0	0	0	1	0	0	1	1	0
Hartford	0	0	2	1	0	0	1	15	0
New Haven	0	0	0	0	0	0	0	14	0
MIDDLE ATLANTIC									
New York:									
Buffalo	1	0	1	0	0	0	1	1	0
New York	4	2	1	2	0	0	7	512	61
Rochester	1	0	0	0	0	0	1	0	0
New Jersey:									
Camden	0	0	0	0	0	0	0	0	2
Newark	2	0	0	0	0	0	1	9	3
Pennsylvania:									
Philadelphia	4	3	0	0	1	1	0	3	1
Pittsburgh	0	0	0	1	1	0	0	0	0

City reports for week ended August 15, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	0	0	1
Cleveland	1	0	0	0	0	1	1	2	0
Indiana:									
Indianapolis	2	0	0	0	0	0	0	0	0
Illinois:									
Chicago	2	2	0	0	0	0	1	13	3
Springfield	0	0	0	0	0	0	0	1	0
Michigan:									
Detroit	2	0	0	0	0	0	1	10	1
Grand Rapids	0	0	0	0	0	0	0	4	0
Wisconsin:									
Madison	0	0	0	0	0	0	0	3	0
Milwaukee	0	0	0	0	0	0	0	7	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	14	1
Minneapolis	0	0	0	0	0	0	0	2	0
St. Paul	1	0	0	0	0	0	0	4	0
Missouri									
St. Joseph	0	0	0	0	0	0	0	0	1
St. Louis	1	0	0	0	0	0	0	0	0
North Dakota:									
Fargo	0	1	0	0	0	0	1	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	2	0	0	0	0	0	1	0	0
District of Columbia:									
Washington	1	0	0	0	1	0	0	1	0
West Virginia:									
Wheeling	0	0	0	0	0	0	0	0	1
South Carolina:									
Charleston	0	0	0	0	0	2	0	0	0
Columbia	0	0	0	0	0	0	0	1	0
Georgia:[1]									
Atlanta	0	0	0	0	0	0	0	1	1
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	2	1	0	0	1	0	0	0	0
Alabama:									
Birmingham	4	0	0	0	1	2	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
Shreveport	0	0	0	0	0	1	0	1	0
Texas:									
Dallas	0	0	0	0	1	1	0	0	0
Galveston	0	0	0	0	0	1	0	0	0
Houston	0	0	0	0	0	1	0	0	0
MOUNTAIN									
Montana:									
Missoula	0	0	0	0	0	0	0	1	0
New Mexico:									
Albuquerque	0	0	0	0	1	1	0	0	0
PACIFIC									
Washington:									
Tacoma	1	0	0	0	0	0	0	0	0
Oregon:									
Portland	0	0	1	1	0	0	0	0	0

[1] Typhus fever, 3 cases at Savannah, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended August 15, 1931, compared with those for a like period ended August 16, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Symmary of weekly reports from cities, July 12 to Aug. 15, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930
98 cities	42	48	33	37	[2] 36	38	[3] 32	37	[4] 33	31
New England	65	36	50	24	53	36	65	34	41	44
Middle Atlantic	35	46	34	33	31	34	26	32	26	22
East North Central	52	66	39	49	[5] 38	48	31	48	[6] 30	36
West North Central	31	39	33	35	17	35	[7] 32	29	36	27
South Atlantic	24	46	28	38	32	40	26	18	[8] 44	38
East South Central	29	12	12	24	12	6	41	18	[9] 19	30
West South Central	47	35	24	31	61	35	64	49	[10] 48	49
Mountain	61	70	35	70	35	35	26	18	78	18
Pacific	51	32	16	28	[11] 62	45	[11] 18	57	[11] 39	30

MEASLES CASE RATES

	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930
98 cities	181	147	133	105	[2] 94	67	[3] 60	49	[4] 39	32
New England	317	256	209	191	132	106	135	99	79	65
Middle Atlantic	142	195	111	144	84	87	57	61	32	39
East North Central	320	70	214	59	[5] 155	33	87	27	[6] 62	19
West North Central	61	50	34	64	27	43	[7] 15	52	11	31
South Atlantic	107	122	83	50	47	60	34	24	[8] 10	24
East South Central	116	42	105	54	47	36	12	18	[9] 25	18
West South Central	17	10	14	7	10	10	3	10	[10] 0	7
Mountain	122	247	174	176	209	159	70	115	61	44
Pacific	123	310	125	164	[11] 54	105	[11] 41	63	[11] 52	43

SCARLET FEVER CASE RATES

	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930
98 cities	70	53	53	49	[2] 47	38	[3] 47	31	[4] 34	30
New England	149	65	111	73	82	60	43	46	53	56
Middle Atlantic	64	35	56	34	52	21	51	20	31	17
East North Central	111	86	69	76	[5] 53	50	60	45	[6] 48	39
West North Central	42	43	29	31	31	48	[7] 21	27	23	29
South Atlantic	34	48	38	40	41	44	38	20	[8] 22	28
East South Central	23	18	6	48	35	6	41	12	[9] 44	48
West South Central	34	21	44	45	20	52	41	35	[10] 17	31
Mountain	26	79	0	26	61	62	61	70	26	44
Pacific	12	49	12	38	[11] 16	34	[11] 26	38	[11] 13	32

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] South Bend, Ind., and San Francisco, Calif., not included.
[3] St. Paul, Minn., and San Francisco, Calif., not included.
[4] South Bend and Terre Haute, Ind., Raleigh, N. C., Covington, Ky., Fort Smith, Ark., and San Francisco, Calif., not included.
[5] South Bend, Ind., not included.
[6] South Bend, and Terre Haute, Ind., not included.
[7] St. Paul, Minn., not included.
[8] Raleigh, N. C., not included.
[9] Covington, Ky., not included.
[10] Fort Smith, Ark., not included.
[11] San Francisco, Calif., not included.

Summary of weekly reports from cities, July 12 to Aug. 15, 1931.—Annual rates per 100,000 population, compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930
98 cities	3	6	3	7	[2] 2	4	[3] 3	3	[4] 1	3
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	4	10	2	8	[5] 1	2	2	6	[6] 8	3
West North Central	4	14	10	21	11	12	[7] 15	6	8	6
South Atlantic	0	4	0	2	2	4	2	2	[8] 2	0
East South Central	0	0	6	18	6	0	0	0	[9] 0	6
West South Central	7	7	0	3	3	14	0	7	[10] 0	3
Mountain	0	18	0	18	0	0	9	0	9	0
Pacific	22	18	20	22	[11] 5	22	[11] 18	4	[11] 3	12

TYPHOID FEVER CASE RATES

	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930
98 cities	13	16	16	18	[2] 27	18	[3] 22	17	[4] 22	20
New England	12	10	10	7	12	7	14	5	26	5
Middle Atlantic	7	4	8	7	13	5	16	10	14	14
East North Central	6	9	5	13	[5] 11	12	10	11	[6] 7	10
West North Central	2	23	19	48	31	23	[7] 21	19	13	29
South Atlantic	47	44	69	42	77	52	53	66	[8] 78	44
East South Central	35	60	47	66	64	108	29	60	[9] 75	132
West South Central	57	59	10	38	169	42	95	14	[10] 45	42
Mountain	26	26	0	18	17	26	44	35	44	26
Pacific	6	16	27	10	[11] 5	16	[11] 18	10	[11] 10	12

INFLUENZA DEATH RATES

	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930
91 cities	2	2	1	2	[2] 3	1	[3] 2	3	[12] 3	1
New England	0	0	0	0	2	0	2	0	0	0
Middle Atlantic	0	3	1	1	4	0	3	2	3	2
East North Central	4	2	2	3	[5] 2	1	1	1	[6] 2	0
West North Central	3	0	0	3	0	0	[7] 0	3	3	3
South Atlantic	4	0	2	4	6	6	0	10	[8] 4	0
East South Central	0	0	0	0	13	0	13	0	[9] 7	0
West South Central	3	11	3	11	0	0	3	0	7	0
Mountain	0	9	0	0	0	0	0	18	17	0
Pacific	0	5	2	2	[11] 7	2	[11] 7	5	[11] 3	0

PNEUMONIA DEATH RATES

	July 18, 1931	July 19, 1930	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930
91 cities	47	43	44	56	[2] 49	52	[3] 48	52	[12] 46	53
New England	50	39	31	44	41	41	34	46	29	41
Middle Atlantic	61	54	55	68	59	59	52	56	56	68
East North Central	32	32	32	38	[5] 30	43	35	47	[6] 37	27
West North Central	71	39	53	57	47	48	[7] 52	45	44	27
South Atlantic	39	54	43	86	65	66	79	72	[8] 56	74
East South Central	44	52	44	91	50	52	63	45	[9] 55	52
West South Central	45	46	52	71	59	75	62	53	52	85
Mountain	35	53	17	79	44	62	44	70	44	123
Pacific	24	15	43	7	[11] 51	35	[11] 34	35	[11] 17	40

[2] South Bend, Ind., and San Francisco, Calif., not included.
[3] St. Paul, Minn., and San Francisco, Calif., not included.
[4] South Bend and Terre Haute, Ind., Raleigh, N. C., Covington, Ky., Fort Smith, Ark., and San Francisco, Calif., not included.
[5] South Bend, Ind., not included.
[6] South Bend and Terre Haute, Ind., not included.
[7] St. Paul, Minn., not included.
[8] Raleigh, N. C., not included.
[9] Covington, Ky., not included.
[10] Fort Smith, Ark., not included.
[11] San Francisco, Calif., not included.
[12] South Bend and Terre Haute, Ind., Raleigh, N. C., Covington, Ky., and San Francisco, Calif., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended August 8, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended August 8, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia	2	1				2
New Brunswick [1]						
Quebec				11		16
Ontario	3			4	2	10
Manitoba						4
Saskatchewan			1		10	1
Alberta				2	1	1
British Columbia				3		
Total	5	1	1	20	13	34

[1] No case of any disease included in the table was reported during the week.

Ontario—Communicable diseases—Comparative—Four weeks ended July 25, 1931.—The Department of Health of the Province of Ontario, Canada, reports certain communicable diseases for the four weeks ended July 25, 1931, and the corresponding period of 1930, as follows:

Disease	1930		1931	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	8	4	4	2
Chicken pox	556	0	328	0
Conjunctivitis	0	0	1	0
Diphtheria	165	6	103	7
Encephalitis	2	2	1	1
German measles	47	0	17	0
Goiter	4	0	0	0
Gonorrhea	181	0	296	0
Influenza	6	0	3	0
Measles	489	0	570	1
Mumps	40	0	132	0
Paratyphoid fever	8	1		2
Pneumonia				
Poliomyelitis	12	4	6	1
Puerperal septicemia	2	0	0	0
Scarlet fever	272	3	210	2
Septic sore throat	0	0	29	0
Smallpox	24	0	22	0
Syphilis	198	0	245	1
Tetanus	1	2	0	0
Tuberculosis	132	37	112	33
Typhoid fever	37	1	44	4
Undulant fever	10	0	22	0
Whooping cough	261	1	317	1

DENMARK

Communicable diseases—May, 1931.—During the month of May, 1931, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	8	Paratyphoid fever	3
Chicken pox	13	Puerperal fever	24
Diphtheria and croup	246	Scabies	599
Erysipelas	229	Scarlet fever	197
German measles	19	Syphilis	103
Gonorrhea	795	Tetanus	6
Influenza	5,364	Typhoid fever	6
Lethargic encephalitis	5	Undulant fever (Bac. abort. Bang)	46
Measles	2,309	Whooping cough	1,423
Mumps	377		

MANCHURIA

Fumigation of vessels at Dairen and Port Arthur.—Information has been received that the Marine Bureau of the Imperial Japanese Kwantung government, on July 1, 1931, established its own service for the fumigation of vessels calling at Dairen and Port Arthur, and that it now issues fumigation certificates. Fumigation was previously performed by the ships themselves under the supervision of the port authorities.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar 7, 1931	Mar. 8–Apr 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931				July, 1931				August, 1931			
						6	13	20	27	4	11	18	25	1	8	15	22
Ceylon: Colombo	C		1		1	1										1	
	D				1	1										1	
China:																	
Canton	C			1	2			1									
	D				1												
Shanghai	C										1						
Swatow	C						3	1	6	7							
Tientsin	C				1		2	8									
	D				1			1									
India	C	11,544	8,968	11,462	13,604	3,932	4,657	4,687	4,725								
	D	6,131	4,550	5,767	7,270	2,146	2,656	2,704	2,831								
Bombay	C			2							1	11	11				
	D			1								6	10				
Calcutta	C	170	436	310	265	94	74	50	74	72	62	55	48				
	D	112	256	176	149	57	47	26	38	35	34	58	28				
Karikal	C	9	12	19	12												
	D	8	12	14	7												
Madras	C	72	20	26	52	3	6			2	2						
	D	29	10	13	17		4										
Moulmein	C											1					
	D											1					
Negapatam	D	3															
Rangoon	C				2		2		2		1	2	1				
	D				1		1		1			1					
Tuticorin	C	1															
Vizagapatam	C								1								
India (French):																	
Chandernagor	C	5	7	6	4		1	2		1	1	1					
	D	5	6	5	4		1	2			1						
Pondicherry	C	100	100	24	17	1	1	1						1			
	D	34	18	4	7	1	1	1						1			
India (Portuguese)	C								1		2						
	D										1						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11	July 18	July 25	August, 1931: 1	Aug. 8	Aug. 15	Aug. 22
Indo-China (see also table below):																	
Cochin-China—Rachgia	C													P			
Pnompenh	C	9		2		1					1	4					
	D	5	1	1	2	1					1	1					
Saigon and Cholon	C	4	5	27	104	18	16	14	13	8	3	3					
	D	4	5	22	76	9	14	9	9	3	2	2					
Iraq:																	
Abulkhasib	C																6
	D																5
Amara	C																2
	D																1
Basra	C													3	9	263	148
	D													2	8	140	76
Persia: Rafsanjan [1]	C				36												
	D				14												
Philippine Islands: Provinces— [2]																	
Capiz	C	186	48	29	17	4											
	D	116	41	24	15	4											
Cebu	C														1	1	1
	D														1	1	1
Iloilo	C	95	7			8	7	5	6	24	3						
	D	65	4			6	5	6	4	22	3						
Masbate	C		21														
	D		9														
Negros, Occidental	C	4							2								
	D	4							1								
Pampanga	C				1												
Siam	C	1	10	16	14		1	3		1	1						
	D		2	4	5		1	1			1						
Ayudhaya District	C		1														
Bangkok	C	2	3	3	3				1	1			3				
	D	1	2	2	1				1				2				
Bismulok Province	C		8														
	D		2														

Place																	
On vessel:																	
S. S. Arankola, at Rangoon from Calcutta	C				1												
S. S. City of Eastborne, at Calcutta from Cocanada	C					1											
S. S. Tairea, at Penang from Calcutta	C						1										
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C												1				
	D												1				
S. S. Kohistan, at Basra from Bushire, Persia	C												2				

Place		January, 1931	February, 1931	March, 1931	April, 1931			May, 1931			June, 1931			July, 1931	
					1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20
Indo-China (French) (see also table above):															
Cambodia [3]	C	62	125	79	36	22			44	40	83	96		72	82
Cochin-China [3]	C	24	29	105	22	40		1	52	75	71	69		66	30

PLAGUE

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended—														
					May, 1931				June, 1931				July, 1931				August, 1931		
					9	16	23	30	6	13	20	27	4	11	18	25	1	8	15
Algeria:																			
Algiers	C	1	1													2			
	D		1																
Bone	C								1										
Constantine, vicinity of	C	1																	
Philippeville	C																	1	
	D																	1	
Argentina:																			
Cordoba Province	C	2																	
Entre Rios Province—Diamante	C	2																	
Jujuy Province—Palpala	C	1																	
San Juan Province	C													P	P				
Santa Fe	C	2																	
Belgian Congo	C		2							1									
	D		2							1									

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15
British East Africa (see also table below):																			
Tanganyika	C	22	8	18	17	5	7	17	4	7	5	1							
	D	4	1	21	11	2	8	9	2	4	1	3							
Uganda	C	15	19	35	11	33	31	63		91	106	101							
	D	15	19	32	11	26	28	61		87	100	99							
Ceylon: Colombo	C	11	8	4	1	1		1		1		1				1	4		
	D	13	7	3	1	1		1		1		1				1	4		
Plague-infected rats		3	4	1			5										1		
China: Amoy [1]	C				1														
	D				1														
Dutch East Indies:																			
Batavia and West Java	C	141	84	74	18	12	14	15	15	25	11	15	21	18					
	D	128	80	71	18	12	14	15	15	25	11	15	21	18					
East Java and Madura	C	1	4	1	1														
	D	1	4	1	1														
Java and Madura	D	376	277	243	47	41	46	42	41	53	48	45	59	55					
Egypt:																			
Alexandria	C	2	1								3	1	1	1	2	9	4	3	1
	D										3	1	1			4	1	2	
Plague-infected rats		1																	
Assiout	C	41	13	32	4	5	8	1	4		5	2							
	D	11	6	17	2	4	1					1							
Beni-Suef	C			12	3		2												
	D			3	1		2												
Beheira	C																1		1
Cairo	C		1																
Dakahlia	C														1			2	
Deirout	C	16		3	7	1		2	3										
	D	4		1	2	2			1										
Gharbieh	C									1									
	D									1									
Girga	C		86	44	1	1		5					1						
	D		24	22	1	1													
Kena	C		5	3			1												
	D		2	1			1												
Manfalut	C	15	17																
	D	5	3																

Minieh	C		3	1	5		1		3				10		2				
	D		2		2		1		1				2		1	1			
Port Said	C									1	1	1	1	1	2	1	2		
	D						1				1	1	1						
Tanta	C																		2
Hawaii Territory:																			
Hawaii—Hamakua—Plague-infected rats							1												
Maui Island—Kula District	C																	1	
	D																	1	
India	C	5,457	9,139	6,142	434	139	130	49	29	24	9	16							
	D	3,661	7,037	5,199	335	143	131	33	25	14	2	10							
Bassein	C	1		1			1						1			3			
	D	1		1			1						1			2			
Bombay	C	1	4	11	5	1	1	1					1						
	D	1	3	11	4	1	1												
Plague-infected rats		32	70	137	26	30	17	21	10	10	10	7	11	16	9	12			
Calcutta	C			2															
	D			2															
Madras Presidency	C	74	23	3	1	1				1									
	D	46	21	2		1				1									
Rangoon	C		1	1	1			1		1					2				
	D		1	1	1			1		1					1				
Plague-infected rats		8	7	4	1	1	3	2		3			1	2	2	1			
Indo-China (see also table below): Pnompenh	C	1							1		1								
	D	4	6	4					1		1								
Iraq:																			
Baghdad	C	3	8	23	7	10	4	2	10	6	1	6	1	1	1				1
	D	2	5	8	3	4	2		1	4	1	3	1		1				
Maudhan	C							2											
Madagascar (see also table below): Tamatave	C																1		
Nigeria: Lagos	C			5															
	D			5															
Plague-infected rats				6															
Peru (see table below).																			
Senegal (see table below).																			
Siam	C	18	31	1	1			1	1										
	D	14	7	1	1			1	1										
Bangkok	C	6	29																
	D	5	6																
Nagara Rajsima	C	7	1																
	D	6																	
Syria: Beirut	C	1												1		1			
Tripolitania	C	1																	
Tunisia: Tunis	C	14	10	16	7		8	1		8	2	1							
	D	7	4	8	3					1									
Union of South Africa:																			
Cape Province	C			3															
Orange Free State	C	1	6	2			1	1											
	D	1	1	2				2											

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
British East Africa (see also table above):							
Kenya	C	21	7	345	245	154	
Indo-China (see also table above)	C		4	11		2	
Madagascar (see also table above):							
Ambositra Province	C	92	70	30	19	15	
	D	88	66	29	18	15	
Antisirabe Province	C	84	83	48	7	7	
	D	79	74	47	7		
Miarinarivo Province	C	31	19	6	2		
	D	29	19	6	2		
Moramanga Province	C	7	1		2		
	D	7	1		2		
Tananarive Province	C	145	90	41	18	2	
	D	139	81	40	18	1	

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Peru	C	12					
	D	6					
Senegal:							
Baol [1]	C				4		9
	D				3		6
Dakar [1]	C			2	63	64	28
	D			1	40	53	17
Louga [1]	C		14	1	5		4
	D		6		2		2
Rufisque [1]	C	2			1	2	24
Thies [1]	C					12	2
	D					3	2
Tivaouane [1]	C			4	19	3	3
	D				11	2	2

SMALLPOX

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	May 16	May 23	May 30	June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11	July 18	July 25	Aug. 1, 1931
Algeria:																		
Algiers	C	1	1	2	2			1			7	1				1		
Bone	C	1																
Constantine	C			1		1								1				
Arabia: Aden	C	1	1															
Belgian Congo	C	50					7	10	30									
Belgium	C		1															
Bolivia. [2]																		
Brazil: Porto Alegre (alastrim)	C	3	7	49	53	2	4	7	6	2	3			9				
	D		1	1						1								

British East Africa: Tanganyika	C	70	91	8			13					1	6	37				
	D	5	13	3										7				
British South Africa: Southern Rhodesia	C	13									1							
Canada:																		
Alberta	C	7	1												1			
British Columbia	C	2	8													2		
Manitoba	C	1	1			4												
Winnipeg	C		1															
Nova Scotia	C	1		1														
Ontario	C	49	29	9	17	17	5		3		4	3	14	5	6	12		
Kingston	C	1	1		5													
North Bay	C		1															
Ottawa	C	3	1									1						
Sault Ste. Marie	C	30	2		4		1											
Toronto	C			2	4	1						1						
Quebec	C	2												1				
Saskatchewan	C	38	63	58	46	7	15	13	8	7	16	18	13		13	10		
Regina	C		1	2	2	2												
Canary Islands: Las Palmas	C			1														
Chile:																		
Antofagasta	C													1				
Chanaral	C								1									
China:																		
Amoy	C			1	2	2	1	1	2	1	2		1	1	1			
	D			1	1	1		1	1	1	1		1	1	1			
Canton	C		3	7	4			1	2			1		1				
Foochow	C	P	P	P	P				P		P							
Hankow	C													1				
Hong Kong	C	1	9	2	3				1									
	D		3	2	1	1			1									
Manchuria—																		
Harbin	C	1	4	2		1	1		1									
[1] Kwantung—Dairen	C			2	2	1			1	1								
Nanking	C	P	P	P	P	P	P	P										
Shanghai—																		
Foreigners only	C	12	16	6	17	1	4	1	1	2	6	2	1	2	1			
Including natives	D	13	14	10	18	1		3	3	1	5	4	3	2	1	2	1	
Swatow	D	7	13	26	2													
Tientsin	C	1				2									2			
Chosen (see table below).																		
Colombia: Cali	D					1												
Dutch East Indies:																		
Batavia and West Java	C	29	2	1			1	1										
	D	2	1															
East Java and Madura	C								1									
Finland	C				1													
France (see table below).																		

[1] Reports incomplete.

[2] An epidemic of smallpox was reported on May 13 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	Aug. 1, 1931
Great Britain:																		
England and Wales	C	958	745	795	744	186	166	111	107	83	94	62	48	56	45	50	36	26
Bradford	C	4	1	2	6	1	3	1	3			5						
Leeds	C			1	2	1		1										
London	C	140	98	147	227	66	44	37	36	25	50	31	16	21	9	12	12	6
London and Great Towns	C	693	683	544	558	139	108	84	72	57	84	49	38	53	33	34	32	22
	D		1		2					1				1				
Sheffield	C	3	32	10	7													
Stoke-on-Trent	C	1	1															
Greece (see table below).																		
Honduras:																		
Amapala	C		1															
Ocotepeque and Gracias districts	C		P															
Puerto Castilla	C	11	3															
Tegucigalpa	C				1													
Tela	C				1													
India	C	9,623	12,222	11,791	14,265	3,422	2,836	2,477	2,668	2,170	1,856	1,622	1,605					
	D	2,245	2,660	2,261	2,923	709	572	538	530	465	474	376	389					
Bassein	C								1									
Bombay	C	7	6	10	8	2		6	1		2	1	3		1	3		
	D	1	3	4	5	1	1	1	1		1	1	3		1	3		
Calcutta	C	143	251	382	287	24	30	19	16	14	19	14		11	6	2		
	D	100	188	203	224	18	25	17	15	12	18	11		9	4	3		
Cochin	C	29	59	46	39	3												
	D		3															
Karachi	C	3	4	4	6							2						
	D	2		2								1						
Madras	C	16	8	22	19	1	3	3	1			1	1		2			
	D		1	3	5		1	5					1					
Moulmein	C	2																
Negapatam	C				3							2	1					
Rangoon	C		4	3	11	7	5		1		1	4	1	2		1		
	D			1	1	2	1	1	1		1		1	1				
Vizagapatam	C	1	8	2	10			5	1	2	1		3	2		2		
	D		2	1	2			1			1		1	1				

India (French):																		
Chandernagor	C	9	12	14	10	3		4				1		2		1		
	D	1	1	2	7	3		2						2				
Karikal	C	5	19	3	4	1	1	1	1	1	2		3	1	1	1		
	D	4	18		3	1	1	1	1	1	2		3	1	1	1		
Pondicherry Province	C	45	10	14	6	1	2	7	1	3	2	1	1	4	1			
	D	45	19	14	9	1	2	7	1	3	2	1	1	4	1			
India (Portuguese)	C	5	14	8	21			3										
	D		3	3	6			1										
Indo-China (see also table below):																		
Pnompenh	C	1		1				1		2								
	D	1						1										
Saigon and Cholon	C	6	4	8	1		1		1					1			2	1
	D	4	1	8	1		1							1				1
Iraq:																		
Baghdad	C		9		2			1	2		1							
	D								2									
Basra	C								2		1							
Mosul Liwa	C	3	5													1		
	D		1															
Ivory Coast (see table below).																		
Japan:																		
Kobe	C		2															
Nagoya	C															1		
Taiwan	C	1																
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D	1		1	1	1		1			1			1	1		1	
Mexico City and surrounding territory	C		23	33	43	4	10	10	21	5	4	16		12	5	4	1	8
	D	1	8	22	14	4	3	2	2	4	3	6		4	3	1		1
Monterrey	C									1								
Torreon	C				1		1					1	2					
	D				2							1	1					
Vera Cruz	C		3	2	2	1												
Morocco (see table below).																		
Nigeria: Lagos	C			2														
Panama Canal Zone	C	2																
Poland	C		1						3	1	1		1		17		1	
Portugal: Lisbon	C	103	40	52	56	19	14	16	18	5	17	12	14	15	12	18		17
Rumania (see table below).																		
Siam	C	4	2		1			3	3			4	1		1			
	D								1				1			1		
Spain	C	P	P	P												7		
Straits Settlements	C	7	2	4	10				2									
	D	1	1	1	5				2									
Sudan (Anglo-Egyptian)	C	11	97	8	3		3		1									
	D	7	10	2					1									
Sudan (French) (see table below).																		
Syria (see table below).																		
Tunisia: Tunis	C	8		4														
Turkey (see table below).																		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	Aug. 1, 1931
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P											
Orange Free State	C	P	P	P	P	P	P	P	P	P	P							
Transvaal	C	P	P	P														
Upper Volta	C		18	3	3	1	2		85	11		1						
	D			1					1									
On vessel:																		
S. S. Clan Mactoggart at Suez	C		2															
S. S. Matheran at Suez from Calcutta	C	1																
S. S. Clan Buchanan at Suez	C		2															
S. S. Rotterdam at Naples from Venice	C			1														
S. S. Clan McTavish at Manila from Chittagong	C				1													
S. S. Benevue at Sydney from Shanghai	C	1																
S. S. Clan MacBrayne at Cochin	C		1															
S. S. Chilka at Rangoon	C		1															
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C				1													
S. S. Talodi at Suakin	C						1											

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
Chosen	C	1		11		1	4
	D	1		3			
France	C	4	16	15			
Greece	C		4			3	1
Mexico (see also table above)	D		3		1	1	2
Morocco	C		4	6	7	40	48
Rumania	C			1		1	
Turkey	C	63	37	1		9	1
	D	7	6				

Place		December, 1930	January, 1931	February, 1931	March, 1931			April, 1931			May, 1931			June, 1931		
					1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–30
Indo-China (see also table above)	C	61	141	168	125		139	100	42			17	41	30	16	1
Ivory Coast	C	9														
Sudan (French)	C	139			4		P									
	D	20														
Syria: Beirut	C		1												1	

TYPHUS FEVER

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended—													
						May, 1931				June, 1931				July, 1931				August, 1931	
						9	16	23	30	6	13	20	27	4	11	18	25	1	8
Algeria:																			
Algiers	C		2	3	3	3		1	3	4	4		1			1			
Constantine Department	C	31	4	3	9	8	3	5	6	6	3	1	16	2		1			
Oran	C	3	1		1				2	2									
Australia, Western	C			1		1													
Bulgaria	C	13	5	9	30		5	8	3	11	10	6	3						
	D			2	3		1		3	2	1	1	2						
Chile: Valparaiso	D		1																
China:																			
Canton	C	2		1															
Manchuria—Harbin	C	3	5	3	8							1	2						
Shanghai	C	2														1			
Tientsin	C				2														
Chosen (see table below).																			
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C				1						1	1		1					
Beheira Province	C				4														
	D				2														
Cairo	C	1																	
Port Said	C	1																	
Eritrea: Asmara	C			1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 11–Feb. 7, 1931	Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931 9	16	23	30	June, 1931 6	13	20	27	July, 1931 4	11	18	25	August, 1931 1	8
Great Britain: Scotland	C	1																	
Fife County	C								1										
Glasgow	C	2																	
	D	1																	
Greece (see table below).																			
Guatemala [1]																			
Iraq: Baghdad	C		5	2		2													
	D		1			2													
Irish Free State:																			
Cork County—																			
Schull	C														1				
Skibbereen	C										1		1	1					
Kerry County—																			
Dingle	C					1													
Listowel	C												1						
Limerick County—																			
Limerick	C													2				1	
Michelstown	C													1					
Mayo County—Belmullet	C				1														
Japan	C												1						
Latvia (see table below).																			
Lithuania (see table below).																			
Mexico (see also table below).																			
Durango	D																1		
Mexico City, including municipalities in Federal District	C	39	35	216	170	16	27	17	15	7	12	27		25	9	7	9	7	
	D	34	16	84	56	9	7	7	10	4	4	11		4	3	2	3	5	
San Luis Potosi	D		5	5	3			1	1						1	3			
Morocco	C	8	28	7	13		13	29			31	42	28	57	20	24	21		
	D	2	1		1		2	2			2	3	1	4	4				
Palestine	C	2	3	5	5	2	1	1			2	3		2				3	3
Panama Canal Zone—Balboa	C						1	1											
Paraguay: Asuncion	D	4	1	1															
Poland	C	106	189	287	538	92	81	58	67		48	33	16	9	17	13	14		
	D	8	19	15	28	6	4	5	3		2	1	1	2	1	1	1		

Portugal: Oporto	C	1																	
Rumania	C	193	152	214	70	63	52	54		42	16	12	10	2	2	7			
	D	16	24	16	8	10	5	3		4	7	2		2	2	1			
Syria	C						1	3											
Tunisia:																			
Sbeitla, vicinity of	C			20	12														
	D			7															
Sfax	C			2															
Tunis	C	16	18	14	13	12	9	8			64	9		1			1		
	D					1	2				4								
Turkey (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	1	P	P	P	P	P	P	P	P		P	P				
Municipality of East London	C	3		P								1							
Natal	C	P	P	1	P	P		P	P	P	P	P							
Orange Free State	C	P	P	P	P		P	P	P	P	P	P		P	P				
Transvaal	C	P	P	P	P	P	P	P	P	P	P	P		P	P				
Yugoslavia (see table below).																			

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
Chosen: Seoul	C	1		3	4		6
Czechoslovakia	C	60	26		5	11	2
Greece	C	10	17	8	22	6	9
	D	2	2	1	3		
Latvia	C		12				
Lithuania	C	26	3	99	34	10	13
	D	3	1	3	5		2

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
Mexico (see also table above)	D	66	83				
Turkey	C	17	18	15		3	3
Yugoslavia	C	20	12	10	43	14	2
	D	2		1	5		

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reported an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931				June, 1931				July, 1931				August, 1931			
					9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22
Brazil:																				
Alagoas State	C																		1	
	D																		1	
Bahia State	C		1																	
Ceara State	C		2	2		1			1											1
	D			2		1														1
Minas Geraes State	C		2	5	1		1													
	D		1	2	1															
Rio de Janeiro State	C	1	2			1	1													
	D	1	2																	
Cambucy	C	2	1																	
	D	1																		
Padua	C	1																		
Sergipe State	C									1										
British Cameroons: Mamfe	C					3			1		1									
	D					2														
Colombia—Magdalena Province—near Cienaga	C														4					
Gold Coast:																				
Akuse	C												2							
	D												1							
Dagomba District	C																	2		
Kintampo	C														1					
	D														1					
Tamale	C													2						
	D													2						
Wale Wale	C																1			
	D																1			

Ivory Coast:																				
Bobo Dioulasso	C													1						
	D													1						
Grand Bassam	C																4			
Kong Circle	C														4					
Nigeria: Abakaliki	C																	1		
	D																	1		
Senegal: Fodor (Hinterland)	C																			1
	D																			1
Sudan (French)	C														4	P				
Upper Volta—Banfora	C															2				
	D															1				

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SPECIAL ARTICLES

The Cooperative Plague-Eradication Campaign in Peru
Tick Parasite Hunterellus hookeri Howard in West Africa
Rural Health Service in the United States, 1927–1931

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Hugh S. Cumming, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. Williams, *Chief of Division*

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PUBLIC HEALTH REPORTS

VOL. 46 SEPTEMBER 11, 1931 NO. 37

COOPERATIVE CAMPAIGN FOR THE ERADICATION OF PLAGUE IN PERU

FINAL REPORT

By JOHN D. LONG, *Traveling Representative of the Pan American Sanitary Bureau; Medical Director, United States Public Health Service*

Historical.—Bubonic plague made its appearance in Peru in April, 1903. From that date to June 30, 1931, there have occurred in that country 20,269 cases, with an average death rate of 50 per cent. Plague cases have been reported from 197 cities, towns, and villages, and from other places, such as farms and hamlets which have no municipal organization.

The infection has also occurred in about 37 seaports, from which it spread to neighboring places through railways, public roads, and other means of communication.

Pan American Sanitary Code.—On November 14, 1924, the plenipotentiary delegates of 18 countries, represented in the Pan American Union, signed ad referendum, in Habana, a sanitary treaty known as the Pan American Sanitary Code. This treaty has for its purpose, among other things, the prevention of the international spread of infections or diseases likely to be conveyed to human beings, and the standardization of cooperative measures for the prevention of the introduction and spread of disease into and from the territories of the signatory countries. The Government of Peru ratified this treaty in 1925.

Action by the Pan American Sanitary Bureau.—In June, 1929, the directing council of the Pan American Sanitary Bureau, after considering the resolutions adopted by the Eighth Pan American Sanitary Conference, held in Lima, Peru, in October, 1927, authorizing the appointment of traveling representatives of the bureau, and, pursuant to the powers regarding cooperative work in the Pan American Sanitary Code, authorized cooperative epidemiological studies of plague in such South American countries as had plague in their territories and were willing to accept such cooperation. The Government of Peru accepted the proposed cooperation and, by an executive decree of September 5, 1930, authorized a cooperative campaign against bubonic plague. For the part played by Peruvian authorities in this work, see the last paragraph of this report.

Beginning of the campaign.—After finishing the necessary preparations, including purchase of necessary material and the adaptation of a building for laboratory purposes, the antiplague campaign in Peru began October 13, 1930, in Lima, to embrace afterwards, Callao, next the Departments of the North and finally those in the South of the country. All employees were given a month of training at half salary, at Lima, before being sent for work outside the city. Those who failed to show the proper spirit were dismissed, so that only those showing interest, enthusiasm, and faithfulness were kept in the service.

Organization.—The country was divided into sectors which, in general, coincided with the boundaries of the Departments, with the exception of the Department of Lima. To each Department there was sent a sanitary assistant, charged with the duty of spreading poison in all places where cases of plague had developed during the preceding five years. To the chief seaports of the Republic there were sent assistant epidemiologists who were instructed to trap and examine rats and send smears prepared with material from suspected rats or guinea pigs which had died after being inoculated with material obtained from rats.

After having carried out poisoning operations in the Departments of Arequipa and Ica two or three times without finding any case of plague (excepting four doubtful cases at Lomas, in the month of February) or any infected rats, the sanitary assistants and epidemiologists, with the single exception of the epidemiologist at Mollendo, were transferred to the Departments in the north of the country. In the cities of Lima and Callao and the municipalities of Rimac, La Victoria, La Punta, and Bellavista, plague squads, directed by sanitary inspectors, were set to trapping rats and to distributing poison packages in every building.

At the seaports the assistant epidemiologists not only trapped and examined rats, but also sent fleas to the Lima laboratory for identification and computation of prevalence indices. In order to prevent the spread of plague to other seaports and dissemination to foreign countries, rat poisoning was also carried out in the ports themselves and neighboring towns.

Methods used.—As plague is essentially a disease of the rat, transmitted to human beings by rat-infesting fleas, every effort in the campaign was devoted to the destruction of the above-mentioned rodents. For that purpose 70 tons of poison were prepared and distributed throughout all the plague foci in the country. This poison consisted of flour with 18 per cent of arsenic, and, at times, from 5 to 10 per cent of grated cheese, or some ground dried fish or dried seal meat. Once prepared, the poison was wrapped in paper,

forming cone shaped packages, which contained about 1 teaspoonful of poison in each package.

The traps used in Lima, Callao, and the seaports served not only for the destruction of rats but to make epidemiological studies and determine the flea index, as well as the amount of plague infection among rats.

Results obtained.—The following figures show the results obtained:

Total number of cases of plague in the Republic from April 28, 1903, to June 30, 1931	20, 269
Average number of cases per month in the same period	60
Average number of cases per month from 1920 to 1930	51. 6
Average number of cases per month, 1930	31. 5
Average number of cases per month, January 1 to June 30, 1931	16

(NOTE.—In general, the months of November, December, January, February, March and, at times, April, are those showing the largest number of cases.)

Cases in the whole Republic during the year 1930

January, 56; February, 29; March, 16; April, 36; May, 26; June, 26; July 11; August, 22; September, 13; October, 28; November, 37; December, 78.

Cases in the Republic in 1931

January, 33; February, 28; March, 9; April, 16; May, 2; June, 9; July, 1 (up to July 20).

Cases in the Republic since the beginning of the antiplague campaign

October, 1930, 28, in 13 foci; November, 37, in 12 foci; December, 78, in 23 foci; January, 1931, 33, in 14 foci; February, 28, in 12 foci; March, 9, in 5 foci; April, 16, in 7 foci; May, 2, in 2 foci; June, 9, in 4 foci; July, 1 (to July 20), in 1 focus.

Cases in Lima since the beginning of the campaign

October, 1930, 2; November, 4; December, 7; January, 1931, 0; February, 2 [1]; March, 2 [1]; April, 0; May, 0; June, 3 [1].

Epidemiological data.—As Dr. C. R. Eskey, consulting epidemiologist of the campaign, will submit a detailed epidemiological report, it will not be necessary to treat extensively that phase of the subject in this report.

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[1] The cases reported in February, March, and June were, in all probability, not contracted in Lima by autochthonous infection. One of the February patients was a tramp without a permanent home who had been looking for work not only in the city of Lima, but on the neighboring plantations; the other, a Chinaman, lived practically under the same conditions. Of the March cases, I was able to verify that one had become ill through infection brought in, probably, from Huacho. The other had also been infected, in all probability, outside the city.

The three cases reported in June occurred in the vicinity of the Central Market. The first became ill five days after having removed a rat from a trap, and the other two had lived together in the same room of a boarding house near the Central Market. Two infected rats were caught in the same neighborhood, and there are good reasons for believing that the infection was introduced from the outside, through merchandise brought for sale to the market, as happened with the case in March. After an intensive poisoning drive in the market and all the nearby houses, no more cases of plague occurred, nor has even one infected rat been found there.

Other than the rat, there has not been found in any part of the country any rodent or other animal acting as a reservoir for plague, with the single exception of an infected mouse, which was found dead in the same room in Lima where the two cases of plague were discovered. Many animals, such as wild rats, buzzards, and others, were examined, but none of them was found infected.

There are three species of rats in Peru. The most common is the *Rattus norvegicus.* There also exist large numbers of *Rattus rattus* and *Rattus alexandrinus.* All of these are, or may be, plague vectors. They also act as hosts for *X. cheopis,* the flea generally responsible for the dissemination of plague.

Eight varieties of fleas have been found. Among them one new variety has not been identified as yet—possibly two new varieties.

The flea index which, at the beginning, was 8 per rat, in Lima, has decreased to less than 1 per rat. The highest index found in the country was in Pacasmayo, and was 34 per rat. The index has decreased there to less than 4 per rat. In general, the flea index in the entire country has been reduced between 80 and 90 per cent. After taking into account such factors as climate, humidity, varieties of rats, flea indices, types of construction of dwellings, and customs of the people, the epidemiological studies indicate that the following-named places are most favorable for harboring plague:

Department of Piura, especially in the villages of Ayavaca and Huancabamba. However, since the marked diminution of cases of plague in the Province of Loja, Ecuador, the number of cases in the Department of Piura has decreased considerably. The cooperative work by Peru and Ecuador, in accordance with an agreement signed in Piura, July, 1930, by representatives of both countries, should continue.

Department of Lambayeque, especially on certain plantations in the vicinity of Chiclayo and in Villa Eten.

Department of La Libertad, especially in Pacasmayo, San Pedro, certain plantations in the valleys of Chicama and of Santa Catalina and in the city of Trujillo.

Department of Lima, more especially in the Huacho and Huaral country region, and also in the plantations along the Rimac and Carabaillo Rivers. Without a doubt, the latest infections in Lima were introduced from Huacho, Huaral, and neighboring plantations. This was clearly brought out in one of the cases of plague which occurred in the month of March, and there are valid reasons for believing that the cases in February, March, and June may be traced to the same source.

Another phenomenon attracting considerable public attention and which has been observed personally by the writer in Lima, Callao, and Miraflores, and in Monsefu, Villa Eten, Chiclayo, and other towns, is

the marked decrease in the number of fleas in comparison with the usual number of fleas found previously in these places.

This same fact has been noted in antiplague campaigns in other countries and generally coincides with a decrease of from 50 to 60 per cent in the number of rats, and serves, to a certain extent, as evidence of the success attained by the use of poison.

Epidemiological data for the seaports

Ports	Number of rats trapped	Infected rats	Human cases in the year 1931	Date of last case
Mollendo	1,823	None.	None.	
Cerro Azul	312	None.	None.	
Pisco	763	None.	None.	
Chimbote	58	None	None.	
Salaverry	1,349	3	1	January.
Pacasmayo	849	6	4	February.
Eten	567	None.	None	
Pimentel	267	None.	None.	
Paita	1,469	1	None.	
Callao	4,931	None.	None.	

Number of poisonings

Mollendo, 5; Cerro Azul, 2; Pisco, 3; Chimbote, 3; Salaverry, 5; Pacasmayo, 5; Eten; 6; Pimentel, 6; Paita, 4; Callao, 4.

Epidemiological data for Lima since January 1, 1931

Human cases of plague, 7; last case in June.

Rats trapped, 26,336; rats examined, 22,448; infected rats, 6; infected mice, 1; last infected rat found in June.

Statistical data of plague for Peru

Cases reported since April 28, 1903	20,269
Annual average	720
Annual average from 1920–1930	619
Number of cases in 1930	378
Number of cases from January 1 to June 30, 1930	189
Number of cases from January 1 to June 30, 1931	97

Number of monthly cases in 1930 and 1931

1930:

January, 56; February, 29; March, 16; April, 36; May, 26; June, 26; July, 11; August, 22; September, 13; October, 28; November, 37; December, 78.

1931:

January, 33; February, 28; March, 9; April, 16; May, 2; June, 9; July, 1 (up to July 20).

NOTE.—The antiplague campaign began October 13, 1930.

Number of plague foci in the country since 1903	197
Number of foci in the last five years	108
Number of foci and adjacent places poisoned	125

NOTE.—In reporting plague foci, no account is taken of many plantations and other places lacking a municipal organization.

Number of poisonings	297
Tons of poison distributed	70
Packages of poison in 70 tons	21, 000, 000
Estimated number of rats destroyed	4, 000, 000

NOTE.—The number of rats destroyed is estimated by observations made in different towns to the effect that rats usually eat from one-fifth to one-sixth of the packages distributed in the houses.

Cost of the antiplague campaign

Total monthly expenses approved by the Government from September, 1930, to June 30, 1931, 10 months, Peruvian soles	[2] 155, 574
Cost per rat destroyed (as calculated above), Peruvian sol	[3] 0. 038
Tons of commercial arsenic used	12. 6
Tons of other material used, flour, etc	57. 4
Traps in use, including cages and snap or deadfall traps	12, 000

From the beginning the campaign was conducted in the most economical manner possible, and, as a result, there is a small balance left in the treasury of the Department of Public Works. This surplus will be used to purchase arsenic and new traps to replace those which have become useless during the campaign. The necessary orders have already been sent out and the articles should arrive sometime during the month of August.

All the salaries, wages, accounts, and invoices up to June 30, 1931, have been paid.

Accounting.—The monthly expenses of the campaign were budgeted in the month preceding that in which the money was to be spent.

As soon as the budget was approved and the order for payments signed, the money was deposited, in cash, by the Director of the Treasury with the cashier of the Department of Public Works. As needed, funds were withdrawn by means of invoices previously approved by the National Chief of the Antiplague Campaign and one of the representatives of the Pan American Sanitary Bureau, as well as the National Director of Health. As a result of this simple, rapid, and efficient method of procedure, it was possible to have constantly on hand an up-to-date financial statement of the campaign; and, as all purchases were on a cash basis, or cash on presentation of bills, the articles were obtained at much lower prices than would otherwise have been the case, resulting in great economy.

This method was authorized by executive decree of September 5, 1930, and should continue when the permanent antiplague service becomes operative.

Remarks.—The number of plague cases (97) occuring in the first six months of 1931 is only 51.3 per cent of the number (189) occurring in the first six months of 1930 and 25 per cent of the average (386) for the first six months of the years 1920–1930. However, there is a remarkable difference in the statistics of the years referred to, because

[2] About $43,747.

[3] About $0.01.

in previous years the monthly average varied but slightly, while during the year 1931 there has been an almost constant decrease, beginning with the month of December, 1930, due to the antiplague campaign.

All the seaports of the country are free from bubonic plague. There has not been a case of plague in any seaport, according to the records of the Department of Public Health, since April, 1931. This last case was reported from Puerto Chicama, and there are grounds for assuming that it was either imported or infected in some other locality and was not autochthonous to the seaport. The last plague-infected rat found in a seaport was in Pacasmayo, March 3, 1931. Among the sixty-odd seaports in the country, 37 have had plague since 1903. Unfortunately, it is not possible to declare as yet any port clean, due to the presence of cases of smallpox in various parts of the country and the lack, in some of the ports, of certain requirements contemplated by the Pan American Sanitary Code.

As explained above, there have been 197 urban foci of plague in the country since 1903. This figure was reduced to 108 during the years from 1925 to 1930. In the first six months of 1931, there were only 34 urban foci and, during the last three months, when the results of the antiplague campaign were most evident, only 13 active foci. In a sense, therefore, it may be considered that bubonic plague is under control in Peru, but it can not be said to be definitely eradicated as yet, for there may still be sporadic cases from time to time.

Recommendations.—The National Antiplague Service should continue its activities with determination and energy, at least for a year, and, preferably, two years, from the date on which the last case was reported.

An advisory commission should be appointed, composed of the following members of the consulting board of the Department of Health: Drs. Abel Olaechea and Ramón E. Ribeyro, and the Assistant Director of Health.

The advisory commission should make frequent inspections of the activities of the National Plague Service, interviewing the chief of the service, auditing the accounts of the campaign, and one of its members should place his approval, together with that of the chief of the service, on all accounts, pay rolls, and invoices, before sending them to the Director of Health for approval.

The employees of the National Antiplague Service, appointed by executive decree of July 15, 1931, must be regarded as holding permanent positions while performing their duties satisfactorily, and no employee should be removed without the knowledge and approval of the advisory commission. This recommendation is made because of the fact that those employees who have been retained as permanent employees in the service are those showing most interest and ability

and faithfulness, and, having more experience, a better knowledge of the work.

Epidemiological studies and experience with the cases of plague which occurred in the months of March and June demonstrate clearly that the Central Market of Lima is a constant menace to public health from the standpoint of bubonic plague. An infection may occur at any time, brought in in loads of vegetables, merchandise, or other products coming from infected places. Consequently, it is absolutely necessary to reconstruct the market and make it rat proof. Also, all the houses, the warehouses, grocery stores, and places where provisions and merchandise are stored should be made rat proof. The storage of such products in private houses or dwellings must be definitely prohibited and there must be in operation a service of inspection, charged with the duty of enforcing these provisions.

The National Antiplague Service, in the form in which it is organized, can poison all the plague foci of the country every three months, and, at the same time, apply preventive measures should any case of plague develop. The methods which have proved successful up to the present time must continue without modification.

Acknowledgment.—The Government of Peru, since the beginning of the campaign, has demonstrated much interest and rendered all assistance possible. The same may be said of the Ministry of Public Works and the Department of Health. Those especially entitled to mention are the Minister of the Treasury, Don Rafael Larco Herrera, the present Director of the Treasury, Mr. Campodónico, the accountant of the Ministry of Public Works, Mr. J. F. Cortez, Dr. Nicolás Cavassa, chief of the National Antiplague Service up to January, 1931, and Dr. Benjamin Mostajo, epidemiologist and chief of the National Antiplague Service. Credit must be given for the greater part of the success attained to the interest, enthusiasm, and application of Doctor Mostajo.

OCCURRENCE OF A COLONY OF THE TICK PARASITE HUNTERELLUS HOOKERI HOWARD IN WEST AFRICA

By Cornelius B. Philip, *Associate Entomologist, United States Public Health Service*

Interest in hymenopterous parasites of ticks has been increasing of late, particularly in relation to their possible value as a means of combating disease-carrying ticks in the United States. Studies relating to this subject are being conducted in Montana by Prof. R. A. Cooley and his associates of the State Board of Entomology with a parasite, *Ixodiphagus caucurtei* du Buysson, introduced from France in 1926.

Opportunity to make limited observations of tick-parasite activities was presented incidental to the investigations of the writer while in Nigeria as a member of the West African Yellow Fever Commis-

sion of the International Health Division of the Rockefeller Foundation. These observations are recorded because they indicated the existence of a well-established colony of tick parasites which apparently offers an exceptional opportunity for intensive bionomical studies under natural conditions. The discovery of this colony has already been noted. (Philip, 1931.)

The first clue to the occurrence of such parasites near Lagos was the observation in February, 1929, of a minute hymenopteron on a dog which had been allowed to wander about the vicinity of the Commission compound at Yaba. The insect retreated into the hair of the animal too quickly to be captured.

Rhipicephalus sanguineus Latr. was the tick which was most in evidence in southern Nigeria. It was most commonly found on dogs and was practically never observed on human beings, despite frequent contacts with infested areas. The European residents of the region make a practice of "ticking" their pets every 2 or 3 days, so abundant are these pests in several residential sections at certain seasons of the year. Examination of dogs in the vicinity of Apapa, a European settlement on the mainland near Lagos Harbor, revealed large numbers of adult parasites on dogs from late March to June, 1929. They were found on both long-haired and short-haired animals, particularly those belonging to residents living on the edge of the settlement where the dogs had access to grassy areas bordering "the bush."

Engorged nymphs of *Rhipicephalus* which were picked from two European owned dogs at Apapa during the 3 weeks prior to April 12, 1929, were separated in a number of vials and stored at laboratory temperature. Flat and partially engorged ticks were discarded. Subsequently, parasites emerged in considerable numbers. Emergence counts, however, were delayed until September 30, with the results presented in the accompanying table. Isolations to determine the number of parasites emerging from individual nymphs were not attempted.

Percentage of parasitism among engorged nymphs of R. sanguineus

Nymph lots separated April 12		Parasitized nymph count September 30			
		Parasites recovered		No parasitism evident	
Vial No	Total number of nymphs	Nymphs with emergence holes	Nymphs with parasites unescaped	Shrunken nymphs	Adult ticks molted out
1	36	26	5	4	1
2	73	49	16	8	0
3	5	3	0	2	0
4	36	25	9	2	0
5	58	48	8	1	1
6	65	48	10	7	0
7	50	32	12	6	0
Total	323	231	60	30	2

Parasitism of nymphs without emergence holes, as listed in the fourth column, was confirmed by dissection. Twenty contained parasite pupæ and 11 others contained larvæ which had failed to complete development. The remaining 29 contained adult parasites which had been unable to effect an emergence hole through the "shell" of the nymph.

Dissection of the "shrunken nymphs" failed to reveal evidence of parasitism. Whether these nymphs died of mechanical injury after removal from the dogs or as a result of unfavorable storage conditions was not apparent. Parasitism was not evident, although it can not be said that even these had not been parasitized, as death perhaps occurred before development of the parasites was possible.

It is seen, therefore, that 90.09 per cent is the minimum figure for parasitism in the total of 323 nymphs, with the possibility that the percentage was even higher.

A few flat nymphs of *R. sanguineus* were placed in the ears of a caged rabbit and allowed to attach, and some of the adult parasites were then liberated in the ears of the same animal. The females immediately busied themselves looking for ticks and were repeatedly observed to oviposit in the nymphs, although evidence of feeding in the latter was still not perceptible. Unfortunately, lack of time prevented following these experiments further, but the readiness of the parasites to function under confined conditions was demonstrated.

Intensive study of this area through two or more consecutive seasons would be most enlightening as to the behavior of this parasite in a locality where it is established. The present meager figures do not justify conclusions as to its effectiveness in the control of ticks, since the ticks were apparently maintaining themselves in considerable abundance in spite of the heavy parasitism. It is quite possible that, at the time of these observations, *Hunterellus* was just overtaking the *Rhipicephalus* population in the Lagos area, and that an observation a year later would have revealed a marked change in numbers of hosts and parasites. This is further suggested by studies by Thompson and others who have shown that populations of hosts may be on the increase for a number of generations, the effects of parasitism being imperceptible in spite of the fact that with each succeeding generation the parasites are overtaking the hosts and will determine the ultimate destruction of the host population. (See Chapman, 1926, p. 159.)

Whether or not *Hunterellus* has been a native of Nigeria for long is a matter of moment, since it seems so well established near Lagos. The shifting European population, particularly in official work, with consequent movement of pet dogs to the new appointments in the colonies, would have its effect in dispersal of the parasites. If recently introduced, the parasites should still be concentrated in the vicinity of the

European communities. There is little contact allowed between the pets of the Europeans and the local, short-haired dogs in the native sections. Only a few of the latter were examined in the native sections but failed to show evidence of the presence of adult parasites.

Such points as the above could be settled by further observations of the local host-parasite complex. The data secured might also give a

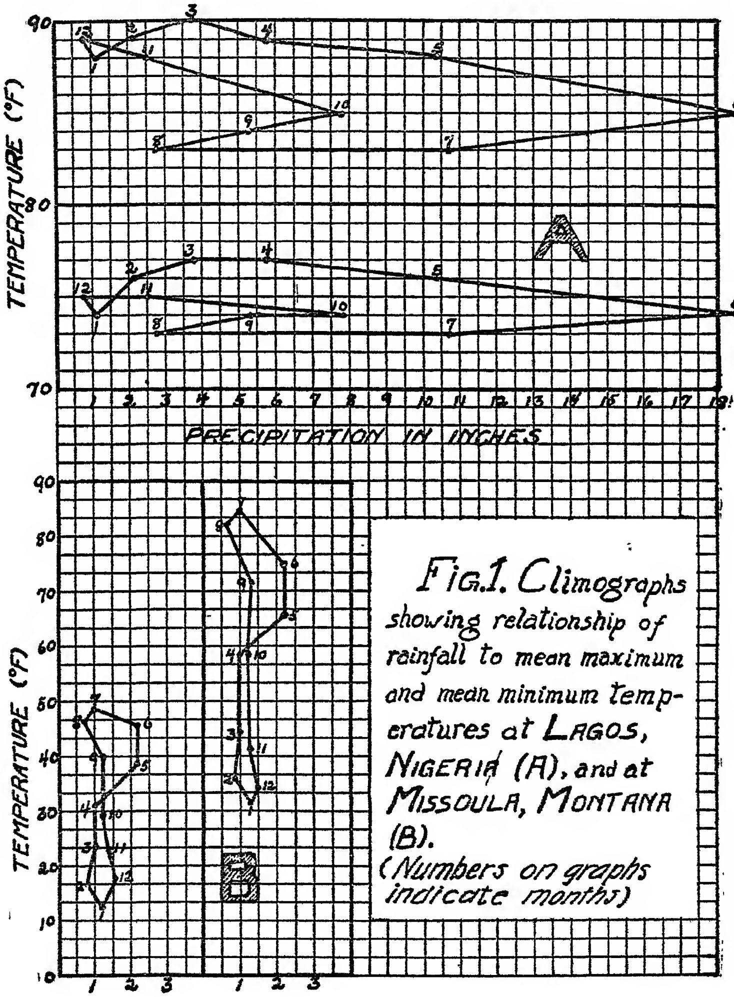

Fig. 1. Climographs showing relationship of rainfall to mean maximum and mean minimum temperatures at Lagos, Nigeria (A), and at Missoula, Montana (B). (Numbers on graphs indicate months)

clue as to the possibilities of using this particular parasite in combating ticks in other localities.

Climographs representing the average rainfall plotted against the mean maximum and mean minimum monthly temperature for a period of 28 years at Lagos, are presented in Figure 1(A) in order that some idea may be gained of the climatic factors under which

this colony of parasites exists. The relative stability of the yearly march of temperature and the tremendous amount of rainfall reaching a maximum in June are to be remarked. Attempts at introduction of such parasites into temperate climates will therefore have to cope with a considerable difference in climate conditions, in addition to the adaptation of the parasites to new tick hosts. Climographs for Missoula, Mont. (Bitterroot Valley) are also presented in Figure 1(B) to give a rough comparison of these climatic differences under temperate conditions within the range of the Rocky Mountain spotted fever tick, *Dermacentor andersoni* Stiles. For obvious reasons it was impossible to plot this graph on the same scale of magnitude as that in (A). The existence of *Hunterellus* in the southern United States indicates that these parasites can become adapted to more temperate conditions, however.

Parasitism was not observed in 5 other local species of Nigerian ticks, whose hosts included hump-backed cattle, rabbits, and snakes, which were collected near Lagos and near Shaki about 300 miles inland.

Hunterellus appears to have become rather widespread. Wood (1911) records localities in Texas and California in the United States, Monterrey in Mexico, and in Lourenço Marques, Portuguese East Africa, as observed by C. W. Howard. Costa Lima (1915) later observed adults on dogs in Brazil, in addition to rearing the parasites from *Rhipicephalus* nymphs collected from the same animals.

The only other observations on adult parasites in nature are reported by Professor Cooley (1929–30), who found *Ixodiphagus* attacking *Hyalomma aegyptium* Linn. in South Africa.

REFERENCES

Chapman, R. N. (1926): Animal ecology, with especial reference to insects. Burgess-Roseberry Company, Minneapolis, Minn.

Cooley, R. A. (1929–30): Tick parasites in Africa. Eighth Biennial Report of the Montana State Board of Entomology, 1929–30, pp. 23–25.

Da Costa Lima, A. (1915): O chalcideo *Hunterellus hookeri* Howard, parasita da carrapato *Rhipecephalus sanguineus* Latrielle, observado no Rio de Janeiro. Rev. Vet. Zootechnia, v, 1915, pp. 201–203.

Philip, C. B. (1931): Découverte en Afrique Occidentale d' *Hunterellus hookeri* Howard, Parasite des Ixodides. Annales de Parasit. Humaine et Comparee, **9**, No. 3.

Wood, H. P. (1911): Notes on the life history of the tick parasite *Hunterellus hookeri* Howard. Jour. Econ. Ent., **4**, 425–431.

EXTENT OF RURAL HEALTH SERVICE IN THE UNITED STATES, 1927–1931[1]

According to data obtained by the Office of Rural Sanitation of the Public Health Service from the health departments of the States, Table 1 presents a list, by States, of counties (or districts) in which the rural sections thereof at the beginning of the calendar years 1927, 1928, 1929, 1930, and 1931, respectively, were provided with local health service under the administration of whole-time county or (local) district health officers.

In making up the lists of counties by States for 1931 it was decided to include as having whole-time health service a number of counties which are operating in groups under the direction of full-time district health officers maintained jointly by the pooling of individual county appropriations. It was also decided to include all counties in which there are whole-time local organizations maintained entirely by the State health department. Including these counties, which in some instances have not been listed heretofore, accounts for some of the increases noted for 1931.

TABLE 1.—*List of counties or districts in which as of January 1, 1927, 1928, 1929, 1930, and 1931, respectively, rural sections were provided with health service under whole-time local health officers*

ALABAMA

1927	1928	1929	1930	1931
Baldwin.	Baldwin.	Baldwin.	Baldwin.	Baldwin.
Barbour.	Barbour.	Barbour.	Barbour.	Barbour.
Calhoun.	Calhoun.	Blount.	Blount.	Blount.
Chambers.	Chambers.	Bullock.	Bullock.	Bullock.
Coffee.	Coffee.	Calhoun.	Calhoun.	Calhoun.
Colbert.	Colbert.	Chambers.	Chambers.	Chambers.
Covington.	Covington.	Cherokee.	Cherokee.	Cherokee.
Dallas.	Cullman.	Clarke.	Choctaw.	Choctaw.
Escambia.	Dale.	Cleburne.	Clarke.	Clarke.
Etowah.	Dallas.	Coffee.	Cleburne.	Cleburne.
Franklin.	Elmore.	Colbert.	Coffee.	Coffee.
Houston.	Escambia.	Conecuh.	Colbert.	Colbert.
Jackson.	Etowah.	Covington.	Conecuh.	Conecuh.
Jefferson.	Franklin.	Crenshaw.	Covington.	Covington.
Lauderdale.	Houston.	Cullman.	Crenshaw.	Crenshaw.
Lawrence.	Jefferson.	Dale.	Cullman.	Cullman.
Lee.	Lauderdale.	Dallas.	Dale	Dale.
Limestone.	Lawrence.	De Kalb.	Dallas.	Dallas.
Madison.	Lee.	Elmore.	De Kalb.	De Kalb.
Marengo.	Limestone.	Escambia.	Elmore.	Elmore.
Marshall.	Madison.	Etowah.	Escambia.	Escambia.
Mobile.	Marengo.	Franklin.	Etowah.	Etowah.
Montgomery.	Marshall.	Houston.	Franklin.	Franklin.
Morgan.	Mobile.	Jackson.	Geneva.	Geneva.
Pike.	Monroe.	Jefferson.	Houston.	Houston.
Sumter.	Montgomery.	Lamar.	Jackson.	Jackson.
Talladega.	Morgan.	Lauderdale.	Jefferson.	Jefferson.
Tallapoosa.	Pike.	Lawrence.	Lamar.	Lamar.
Tuscaloosa.	Sumter.	Lee.	Lauderdale.	Lauderdale.
Walker.	Talladega.	Limestone.	Lawrence.	Lawrence.
	Tallapoosa.	Lowndes.	Lee.	Lee.
	Tuscaloosa.	Macon.	Limestone.	Limestone.
	Walker.	Madison.	Lowndes.	Lowndes.
		Marengo.	Macon.	Macon.
		Marshall.	Madison.	Madison.
		Mobile.	Marengo.	Marengo.
		Monroe.	Marshall.	Marion.

[1] From the Office of Rural Sanitation, United States Public Health Service.

TABLE 1.—*List of counties or districts in which as of January 1, 1927, 1928, 1929, 1930, and 1931, respectively, rural sections were provided with health service under whole-time local health officers*—Continued

ALABAMA—Continued

1927	1928	1929	1930	1931
		Montgomery. Morgan. Pickens. Pike. Shelby. Sumter. Talladega. Tallapoosa. Tuscaloosa. Walker. Washington. Wilcox Winston.	Mobile. Monroe. Montgomery. Morgan. Pickens. Shelby. Sumter. Talladega. Tallapoosa. Tuscaloosa. Walker. Washington. Wilcox. Winston.	Marshall. Mobile. Monroe. Montgomery. Morgan. Perry. Pickens. Pike. Shelby. Sumter. Talladega. Tallapoosa. Tuscaloosa. Walker. Washington. Wilcox. Winston.

ARIZONA

1927	1928	1929	1930	1931
Cochise. Yuma.	Cochise. Coconino. Yuma.	Cochise. Coconino. Yuma.	Cochise. Coconino. Yuma.	Cochise. Coconino. Gila. Maricopa. Pima. Yuma.

ARKANSAS

1927	1928	1929	1930	1931
Garland. Jefferson. Pulaski.	Arkansas. Ashley. Chicot. Conway. Crittenden. Cross. Desha. Drew. Garland. Jackson. Jefferson. Little River. Mississippi. Monroe. Phillips. Pope. Pulaski. Saline. Union. Woodruff. Yell.	Arkansas. Ashley. Chicot. Conway. Crittenden. Cross. Desha. Drew. Faulkner. Garland. Jackson. Jefferson. Little River. Mississippi. Monroe. Phillips. Pope. Pulaski. Saline. Sebastian. Union. White. Woodruff. Yell.	Arkansas. Ashley. Conway. Cross. Desha. Drew. Garland. Jackson. Jefferson. Little River. Mississippi. Monroe. Phillips. Pope. Pulaski. Saline. Sebastian. Union. White. Woodruff. Yell.	Arkansas. Ashley. Clark. Conway. Cross. Desha. Drew. Garland. Jackson. Jefferson. Little River. Lonoke. Mississippi. Monroe. Ouachita. Phillips. Pope. Pulaski. Saline. Sebastian. Union. White. Woodruff. Yell.

CALIFORNIA

1927	1928	1929	1930	1931
Los Angeles. Monterey. Orange. Riverside. San Diego. San Joaquin. San Luis Obispo. Santa Barbara. Yolo.	Los Angeles. Monterey. Orange. Riverside. San Diego. San Joaquin. San Luis Obispo. Santa Barbara. Yolo.	Contra Costa. Los Angeles. Madera. Monterey. Orange. Riverside. San Diego. San Joaquin. San Luis Obispo. Santa Barbara. Yolo.	Contra Costa. Los Angeles. Madera. Monterey. Orange. Riverside. San Diego. San Joaquin. San Luis Obispo. Santa Barbara. Stanislaus. Yolo.	Contra Costa. Imperial. Los Angeles. Madera. Monterey. Orange. Riverside. San Diego. San Joaquin. San Luis Obispo. Santa Barbara. Stanislaus. Yolo.

TABLE 1.—*List of counties or districts in which as of January 1, 1927, 1928, 1929, 1930, and 1931, respectively, rural sections were provided with health service under whole-time local health officers*—Continued

COLORADO

1927	1928	1929	1930	1931
Otero.	Otero.	Otero.	Otero.	Otero.

CONNECTICUT

Fairfield.[1]	Fairfield.[1]	Fairfield.[1]	Fairfield.[1]	Fairfield.[1]

DELAWARE

				Kent. Sussex. New Castle.

FLORIDA

Manatee. Polk. Sarasota.	Manatee. Polk. Sarasota.	Manatee. Polk. Sarasota.	Manatee. Sarasota.	Leon. Manatee. Taylor.

GEORGIA

Baker. Baldwin. Bartow. Bibb. Brooks. Clarke. Cobb. Decatur. De Kalb. Dougherty. Floyd. Glynn. Grady. Hall. Laurens. Lowndes. Mitchell. Richmond. Spalding. Sumter. Thomas. Troup. Walker. Ware.	Baldwin. Bartow. Bibb. Brooks. Chatham. Clarke. Cobb. Coffee. Colquitt. Crisp Decatur. De Kalb. Dougherty. Floyd. Glynn. Hall. Laurens. Lowndes. Mitchell. Richmond. Spalding. Sumter. Thomas. Troup. Walker. Ware. Washington.	Baldwin. Bartow. Bibb. Brooks. Chatham. Clarke. Cobb. Coffee. Colquitt. Crisp. Decatur. De Kalb. Dougherty. Emanuel. Floyd. Glynn. Grady. Hall. Laurens. Lowndes. Mitchell. Richmond. Spalding. Sumter. Thomas. Troup. Walker. Ware. Washington. Wayne. Worth.	Baldwin. Bartow. Bibb. Brooks. Chatham. Clarke. Clinch. Cobb. Coffee. Colquitt. Crisp. Decatur. De Kalb. Dougherty. Emanuel. Floyd. Glynn. Grady. Hall. Jefferson. Jenkins. Laurens. Lowndes. Mitchell. Richmond. Spalding. Sumter. Thomas. Troup. Walker. Ware. Washington. Wayne. Worth.	Baldwin. Bartow. Bibb. Brooks. Chatham. Clarke. Clinch. Cobb. Coffee. Colquitt. Decatur. De Kalb. Dougherty. Floyd. Glynn. Grady. Hall. Jefferson. Jenkins. Laurens. Lowndes. Mitchell. Richmond. Spalding. Sumter. Thomas. Troup. Walker. Ware. Washington.

IDAHO

			Bonneville. Twin Falls.	Twin Falls.

[1] District.

Table 1.—*List of counties or districts in which as of January 1, 1927, 1928, 1929, 1930, and 1931, respectively, rural sections were provided with health service under whole-time local health officers*—Continued

ILLINOIS

1927	1928	1929	1930	1931
Cook.	Cook	Cook.	Cook.	Du Page.
Morgan.	Du Page.	Du Page.	Du Page.	Morgan.
Sangamon.	Morgan	Morgan.	Morgan.	
		Pulaski.		

IOWA

1927	1928	1929	1930	1931
Dubuque.				Washington.
				Woodbury.

KANSAS

1927	1928	1929	1930	1931
Butler.	Butler.	Brown.	Brown.	Brown.
Coffey.	Cherokee.	Butler.	Butler.	Butler.
Ellis.	Ellis.	Cherokee.	Cherokee.	Cherokee.
Geary.	Geary.	Geary.	Dickinson.	Dickinson.
Jefferson.	Greenwood.	Greenwood.	Geary.	Geary.
Lyon.	Jefferson.	Jefferson.	Greenwood.	Greenwood.
Marion.	Lyon.	Lyon.	Lyon.	Lyon.
Ottawa.	Marion.	Marion.	Marion.	Marion.
Phillips.	Ottawa.	Ottawa.	Ottawa.	Ottawa.
	Shawnee.	Shawnee.	Sedgwick.	Sedgwick.
			Shawnee.	Seward.
				Shawnee.

KENTUCKY

1927	1928	1929	1930	1931
Boyd.	Ballard.	Ballard.	Ballard.	Bell.
Daviess.	Boyd.	Bell.	Bell.	Boyd.
Fayette.	Breathitt.	Boyd.	Boyd.	Breathitt.
Fulton.	Carlisle.	Breathitt.	Breathitt.	Bullitt.
Jefferson.	Carter.	Bullitt.	Bullitt.	Calloway.
Johnson.	Daviess.	Carlisle.	Calloway.	Carlisle.
Knott.	Elliott.	Carter.	Carlisle.	Carter.
Mason.	Estill.	Daviess.	Carter.	Daviess.
Scott.	Fayette.	Elliott.	Daviess.	Elliott.
	Floyd.	Estill.	Elliott.	Estill.
	Fulton.	Fayette.	Estill.	Fayette.
	Henderson.	Floyd.	Fayette.	Floyd.
	Hickman.	Fulton.	Floyd.	Fulton.
	Hopkins.	Henderson.	Fulton.	Henderson.
	Johnson.	Hickman.	Henderson.	Hickman.
	Knott.	Hopkins.	Hickman.	Hopkins.
	Lawrence.	Johnson.	Hopkins.	Jefferson.
	Lee.	Knott.	Jefferson.	Kenton.
	Leslie.	Knox.	Johnson.	Knott.
	Letcher.	Lawrence.	Kenton.	Knox.
	Magoffin.	Lee.	Knott.	Lawrence.
	Martin.	Leslie.	Knox.	Lee.
	Mason.	Letcher.	Lawrence.	Leslie.
	McLean.	Magoffin.	Lee.	Letcher.
	Menifee.	Martin.	Leslie.	Lincoln.
	Morgan.	Mason.	Letcher.	Madison.
	Owsley.	McLean.	Magoffin.	Magoffin.
	Perry.	Menifee.	Martin.	Martin.
	Pike.	Monroe.	Mason.	Mason.
	Scott.	Morgan.	McLean.	McLean.
	Webster.	Ohio.	Menifee.	Menifee.
	Wolfe.	Owsley.	Monroe.	Monroe.
		Perry.	Morgan.	Morgan.
		Pike.	Muhlenberg.	Muhlenberg.
		Scott.	Ohio.	Ohio.
		Trigg.	Owsley.	Owsley.
		Webster.	Perry.	Perry.
		Whitley.	Pike.	Pike.
		Wolfe.	Scott.	Scott.
			Trigg.	Trigg.
			Union.	Union.
			Wayne.	Wayne.
			Webster.	Webster.
			Whitley.	
			Wolfe.	

TABLE 1.—*List of counties or districts in which as of January 1, 1927, 1928, 1929, 1930, and 1931, respectively, rural sections were provided with health service under whole-time local health officers*—Continued

LOUISIANA[1]

1927	1928	1929	1930	1931
Caddo. Claiborne. De Soto Lafourche. Natchitoches. Ouachita. Plaquemines. St. Mary. Washington. Webster.	Assumption. Avoyelles. Caddo. Caldwell. Catahoula. Claiborne. Concordia. De Soto. East Carroll. Franklin. Iberia. Lafayette. Lafourche. La Salle. Madison. Morehouse. Natchitoches. Ouachita. Plaquemines. Rapides. Richland. St. Martin. St. Mary. Tangipahoa. Tensas. Washington. Webster. West Carroll.	Assumption. Avoyelles. Caddo. Caldwell. Catahoula. Claiborne. Concordia. De Soto. East Carroll. Franklin. Iberia. Iberville. Lafayette. Lafourche. La Salle. Madison. Morehouse. Natchitoches. Ouachita. Point Coupee. Rapides. Richland. St. Landry. St. Martin. St. Mary. Tensas. Terrebonne. Webster. West Carroll.	Assumption. Avoyelles. Caddo Caldwell. Catahoula. Claiborne. Concordia. De Soto. East Carroll. Franklin. Iberia. Iberville. Lafayette. Lafourche. La Salle. Lincoln. Madison. Morehouse. Natchitoches. Ouachita. Point Coupee. Rapides. Richland. St. Landry. St. Martin. St. Mary. Tensas. Terrebonne. Washington. Webster. West Carroll.	Assumption. Avoyelles. Caddo. Caldwell. Catahoula. Claiborne. Concordia. De Soto. East Carroll. Franklin. Iberia. Iberville. Lafayette. Lafourche. La Salle. Lincoln. Madison. Morehouse. Natchitoches. Ouachita. Point Coupee. Rapides. Richland. St. Landry. St. Martin. St. Mary. Tensas. Terrebonne. Washington. Webster. West Carroll.

MAINE

Oldtown. Rumford.[3] Sanford.[3] Waterville. York.	Motbov Union.[2] Rumford.[3] Sanford.[3] Vassalboro.[3]	Motbov Union.[2] Rumford.[3] Sanford.[3] Vassalboro.[3]	Motbov Union.[2] Rumford.[3] Sanford.[3] Vassalboro.[3]	Motbov Union.[2] Rumford.[3] Sanford.[3] Vassalboro.[3]

MARYLAND

Allegany. Baltimore. Calvert. Carroll. Frederick. Montgomery.	Allegany. Baltimore. Calvert. Carroll. Frederick. Montgomery. Prince Georges. Talbot.	Allegany. Baltimore. Calvert. Carroll. Frederick. Harford. Montgomery. Prince Georges. Talbot.	Allegany. Baltimore. Calvert. Carroll. Cecil. Frederick. Harford. Montgomery. Prince Georges. Talbot. Wicomico.	Anne Arundel. Allegany. Baltimore. Calvert. Carroll. Cecil. Frederick. Harford. Kent. Montgomery. Prince Georges. Talbot. Washington. Wicomico.

MASSACHUSETTS

Cape Cod.[4]	Barnstable.[5]	Barnstable.	Barnstable.	Barnstable

[1] Parishes.
[2] Including towns of Orono, Milford, Bradley, and Veazie.
[3] Town (township) wholly or partly rural.
[4] District.
[5] See Reprint No. 1184, p. 34, from Public Health Reports of Oct. 21, 1927.

Table 1.—*List of counties or districts in which as of January 1, 1927, 1928, 1929, 1930, and 1931, respectively, rural sections were provided with health service under whole-time local health officers*—Continued

MICHIGAN

1927	1928	1929	1930	1931
		Oakland.	Genesee.	Alcona.[1]
		Saginaw.	Oakland.	Alpena.[1]
		Wexford.	Saginaw.	Antrim.[1]
			Wexford.	Charlevoix.[1]
				Cheboygan.[1]
				Crawford.[1]
				Emmet.[1]
				Genesee.
				Iosco.[1]
				Isabella.
				Kalkaska.[1]
				Kent.
				Midland.
				Missaukee.[1]
				Montmorency.[1]
				Oakland.
				Ogemaw.[1]
				Oscoda.[1]
				Otsego.[1]
				Ottawa.
				Presque Isle.[1]
				Roscommon.[1]
				Saginaw.
				Wexford.

MINNESOTA

St. Louis.	St. Louis.	St. Louis.	St. Louis.	St. Louis.

MISSISSIPPI

Bolivar.	Bolivar.	Adams.	Adams.	Adams.
Clarke.	Clarke.	Bolivar.	Bolivar.	Bolivar.
Coahoma.	Coahoma.	Clarke.	Clarke.	Clarke.
Forrest.	Forrest.	Coahoma.	Coahoma.	Coahoma.
Hancock.	Hancock.	Copiah.	Copiah.	Copiah.
Harrison.	Harrison.	Forrest.	Forrest.	Forrest.
Hinds.	Hinds.	Hancock.	Hancock.	Hancock.
Holmes.	Holmes.	Harrison.	Harrison.	Harrison.
Jackson.	Humphreys.	Hinds.	Hinds.	Hinds.
Jones.	Issaquena.	Holmes.	Holmes.	Holmes.
Lamar.	Jackson.	Humphreys.	Humphreys.	Humphreys.
Lee.	Jones.	Issaquena.	Issaquena.	Issaquena.
Leflore.	Lamar.	Jackson.	Jackson.	Jackson.
Pearl River.	Lee.	Jones.	Lamar.	Lamar.
Perry.	Leflore.	Lamar.	Lauderdale.	Lauderdale.
Sharkey.	Pearl River.	Lauderdale.	Lee.	Lee.
Union.	Perry.	Lee.	Leflore.	Leflore.
Washington.	Sharkey.	Leflore.	Lincoln.	Lincoln.
	Sunflower.	Lincoln.	Monroe.	Monroe.
	Tishomingo.	Monroe.	Pearl River.	Pearl River.
	Union.	Pearl River.	Perry.	Perry.
	Warren.	Perry.	Sharkey.	Sharkey.
	Washington.	Sharkey.	Sunflower.	Sunflower.
	Yazoo.	Sunflower.	Tishomingo.	Tishomingo.
		Tishomingo.	Union.	Union.
		Union.	Warren.	Warren.
		Warren.	Washington.	Washington.
		Washington.	Yazoo.	Yazoo.
		Yazoo.		

MISSOURI

Boone.	Boone.	Boone.	Boone.	Boone.
Dunklin.	Dunklin.	Dunklin.	Buchanan.	Buchanan.
Greene.	Greene.	Greene.	Dunklin.	Dunklin.
Holt.	Holt.	Jackson.	Greene.	Greene.
Jackson.	Jackson.	Marion.	Jackson.	Jackson.
Marion.	Marion.	Mississippi.	Marion.	Marion.
New Madrid.	Mississippi.	New Madrid.	Mississippi.	Miller.
Nodaway.	New Madrid.	Nodaway.	New Madrid.	New Madrid.

[1] Included in four districts of four counties each.

TABLE 1.—*List of counties or districts in which as of January 1, 1927, 1928, 1929, 1930, and 1931, respectively, rural sections were provided with health service under whole-time local health officers*—Continued

MISSOURI—Continued

1927	1928	1929	1930	1931
Pemiscot.	Nodaway.	Pemiscot.	Nodaway.	Nodaway.
Pettis.	Pemiscot.	St. Francois.	Pemiscot.	Pemiscot.
St. Francois.	Pettis.	St. Louis.	St. Francois.	Scott.
St. Louis.	Scott.	Scott.	St. Louis.	St Francois.
	St. Francois.		Scott.	St. Louis.
	St. Louis.			

MONTANA

1927	1928	1929	1930	1931
Cascade.	Cascade.	Cascade.	Cascade.	Cascade.
Lewis and Clark.	Lewis and Clark.	Lewis and Clark.	Gallatin.	Gallatin.
Missoula.	Missoula.	Missoula.	Lewis and Clark.	Lewis and Clark.
			Missoula.	Missoula.

NEW MEXICO

1927	1928	1929	1930	1931
Bernalillo.	Bernalillo.	Bernalillo.	Bernalillo.	Bernalillo.
Chaves.	Chaves.	Chaves.	Chaves.	Dona Ana.
Dona Ana.	Dona Ana.	Dona Ana.	Dona Ana.	Eddy.
Eddy.	Eddy.	Eddy.	Eddy.	Lea.
McKinley.	McKinley.	Santa Fe.	McKinley.	McKinley.
Santa Fe.	Santa Fe.	Union.	Union.	Santa Fe.
San Miguel.	Union.	Valencia.	Valencia.	Union.
Union.	Valencia.			Valencia.
Valencia.				

NEW YORK

1927	1928	1929	1930	1931
Cattaraugus.	Cattaraugus.	Cattaraugus.	Cattaraugus.	Cattaraugus.
		Suffolk.	Cortland.	Cortland.
			Suffolk.	Suffolk.
			Westchester.	Westchester.

NORTH CAROLINA

1927	1928	1929	1930	1931
Beaufort.	Beaufort.	Beaufort.	Beaufort.	Beaufort.
Bertie.	Bertie.	Bertie.	Bertie.	Bertie.
Bladen.	Bladen.	Bladen.	Bladen.	Bladen.
Brunswick.	Brunswick.	Brunswick.	Buncombe.	Buncombe.
Buncombe.	Buncombe.	Buncombe.	Cabarrus.	Cabarrus.
Cabarrus.	Cabarrus.	Cabarrus.	Cherokee.	Cherokee.
Carteret.	Carteret.	Columbus.	Columbus.	Columbus.
Columbus.	Columbus.	Craven.	Craven.	Craven.
Craven.	Craven.	Cumberland.	Cumberland.	Cumberland.
Cumberland.	Cumberland.	Davidson.	Davidson.	Davidson.
Davidson.	Davidson.	Durham.	Durham.	Durham.
Durham.	Durham.	Edgecombe.	Edgecombe.	Edgecombe.
Edgecombe.	Edgecombe.	Forsyth.	Forsyth.	Forsyth.
Forsyth.	Forsyth.	Gaston.	Gaston.	Franklin.
Granville.	Granville.	Granville.	Granville.	Gaston.
Guilford.	Guilford.	Guilford.	Guilford.	Guilford.
Halifax.	Halifax.	Halifax.	Halifax.	Granville.
Henderson.	Henderson.	Henderson.	Henderson.	Halifax.
Johnston.	Johnston.	Johnston.	Johnston.	Henderson.
Lenoir.	Lenoir.	Lenoir.	Lenoir.	Johnston.
Mecklenburg.	Mecklenburg.	Mecklenburg.	Mecklenburg.	Lenoir.
Nash.	Nash.	Moore.	Moore.	Mecklenburg.
New Hanover.	New Hanover.	Nash.	Nash.	Moore.
Northampton.	Northampton.	New Hanover.	New Hanover.	Nash.
Pamlico.	Pamlico.	Northampton.	Northampton.	New Hanover.
Pitt.	Pitt.	Pamlico.	Pitt.	Northampton.
Richmond.	Richmond.	Pitt.	Randolph.	Pitt.
Robeson.	Robeson.	Richmond.	Richmond.	Randolph.
Rowan.	Rowan.	Randolph.	Robeson.	Richmond.
Rutherford.	Rutherford.	Robeson.	Rowan.	Robeson.
Sampson.	Sampson.	Rowan.	Rutherford.	Rowan.
Surry.	Surry.	Rutherford.	Sampson.	Rutherford.
Vance.	Vance.	Sampson.	Surry.	Sampson.
Wake.	Wake.	Surry.	Vance.	Surry.
Wayne.	Wayne.	Vance.	Wake.	Vance.
Wilkes.	Wilkes.	Wake.	Wayne.	Wake.
Wilson.	Wilson.	Wayne.	Wilkes.	Wayne.
		Wilkes.	Wilson.	Wilkes.
		Wilson.		Wilson.

TABLE 1.—*List of counties or districts in which as of January 1, 1927, 1928, 1929, 1930, and 1931, respectively, rural sections were provided with health service under whole-time local health officers*—Continued

OHIO

1927	1928	1929	1930	1931
Allen.	Allen.	Allen	Allen.	Allen.
Ashtabula.	Ashtabula.	Ashtabula.	Ashtabula.	Ashtabula.
Belmont.	Belmont.	Belmont.	Belmont.	Belmont.
Butler.	Butler.	Butler.	Butler.	Butler.
Clermont.	Clermont.	Clinton.	Clinton.	Clinton.
Clinton.	Clinton.	Columbiana.	Columbiana.	Columbiana.
Columbiana.	Columbiana.	Coshocton.	Coshocton.	Coshocton.
Coshocton	Coshocton.	Crawford.	Crawford.	Crawford.
Crawford.	Crawford.	Cuyahoga.	Cuyahoga.	Cuyahoga.
Cuyahoga.	Cuyahoga.	Darke.	Darke.	Darke.
Darke.	Darke.	Delaware.	Delaware.	Delaware.
Delaware.	Delaware.	Erie.	Erie.	Erie.
Erie.	Erie.	Fayette.	Fayette.	Fayette
Fayette.	Fayette.	Franklin.	Franklin.	Franklin.
Geauga.	Franklin.	Geauga.	Geauga.	Hamilton.
Hamilton.	Geauga.	Hamilton.	Hamilton.	Hancock.
Hancock.	Hamilton.	Hancock.	Hancock.	Hocking.
Hocking.	Hancock.	Hocking.	Hocking.	Huron.
Huron.	Hocking.	Huron.	Huron.	Jackson.
Jefferson.	Huron.	Jefferson.	Jefferson	Jefferson.
Lake.	Jefferson.	Lake.	Lake.	Lorain.
Lorain.	Lake.	Lorain.	Lorain.	Lucas.
Lucas.	Lorain.	Lucas.	Lucas.	Mahoning.
Mahoning.	Lucas.	Mahoning.	Mahoning.	Marion.
Marion.	Mahoning.	Marion.	Marion.	Meigs.
Meigs.	Marion.	Meigs.	Meigs.	Mercer.
Mercer.	Meigs.	Mercer.	Mercer.	Miami.
Miami.	Mercer.	Miami.	Miami.	Montgomery.
Montgomery.	Miami.	Montgomery.	Montgomery.	Morrow.
Morrow.	Montgomery.	Morrow.	Morrow.	Muskingum.
Muskingum.	Morrow.	Perry.	Perry.	Perry.
Perry.	Muskingum.	Preble.	Pickaway.	Pickaway.
Preble.	Perry.	Richland.	Preble.	Preble.
Richland.	Preble.	Ross.	Richland.	Richland.
Ross.	Richland.	Sandusky.	Ross.	Ross.
Sandusky.	Ross.	Scioto.	Sandusky.	Sandusky.
Scioto.	Sandusky.	Seneca.	Scioto.	Scioto.
Seneca.	Scioto.	Shelby.	Seneca.	Seneca.
Shelby.	Seneca.	Stark.	Shelby.	Shelby.
Stark.	Shelby.	Summit.	Stark.	Stark.
Summit.	Stark.	Trumbull.	Summit.	Summit.
Trumbull.	Summit.	Tuscarawas.	Trumbull.	Trumbull.
Tuscarawas.	Trumbull.	Washington.	Tuscarawas.	Tuscarawas.
Union.	Tuscarawas.	Wayne.	Washington.	Washington.
Washington.	Washington.	Wood.	Wayne.	Wayne.
Wayne.	Wayne.		Wood.	Wood.
Wood.	Wood.			

OKLAHOMA

1927	1928	1929	1930	1931
Carter.	Carter.	Carter.	Carter.	Carter.
Kay.	Kay.	Kay.	Le Flore.	Le Flore.
Le Flore.	Le Flore.	Le Flore.	McCurtain.	McCurtain.
McCurtain.	McCurtain.	McCurtain.	Muskogee.	Muskogee.
Muskogee.	Muskogee.	Muskogee.	Okmulgee.	Okmulgee.
Oklahoma.	Okmulgee.	Okmulgee.	Osage.	Ottawa.
Okmulgee.	Ottawa.	Osage.	Ottawa.	Pittsburg.
Ottawa.	Pittsburg.	Ottawa.	Pittsburg.	Pottawatomie.
Pittsburg.	Seminole.	Pittsburg.	Seminole.	Seminole.
		Seminole.		

OREGON

1927	1928	1929	1930	1931
Clackamas.	Clackamas.	Clackamas.	Clackamas.	Clackamas.
Coos.	Coos.	Coos.	Coos.	Coos.
Douglas.	Douglas.	Douglas.	Douglas.	Douglas.
Jackson.	Jackson.	Jackson.	Jackson.	Jackson.
Klamath.	Klamath.	Klamath.	Klamath.	Klamath.
	Marion.	Marion.	Marion.	Lane.
	Multnomah.	Multnomah.	Multnomah.	Marion.
				Multnomah.

TABLE 1.—*List of counties or districts in which as of January 1, 1927, 1928, 1929, 1930, and 1931, respectively, rural sections were provided with health service under whole-time local health officers*—Continued

PENNSYLVANIA

1927	1928	1929	1930	1931
				Allegheny. Bucks. Luzerne.

SOUTH CAROLINA

1927	1928	1929	1930	1931
Aiken. Anderson. Beaufort. Charleston. Cherokee. Darlington. Dillon. Fairfield. Georgetown. Greenville. Greenwood. Horry. Marion. Newberry. Orangeburg. Spartanburg.	Aiken. Anderson. Beaufort. Charleston. Cherokee. Darlington. Dillon. Fairfield. Georgetown. Greenville. Greenwood. Horry. Marion. Newberry. Orangeburg. Spartanburg.	Aiken. Anderson. Beaufort. Berkeley. Charleston. Cherokee. Darlington. Dillon. Dorchester. Fairfield. Georgetown. Greenville. Greenwood. Horry. Marion. Newberry. Oconee. Orangeburg. Richland. Spartanburg.	Aiken. Anderson. Beaufort. Berkeley. Charleston. Cherokee. Darlington. Dillon. Dorchester. Fairfield. Florence. Georgetown. Greenville. Greenwood. Horry. Kershaw. Lexington. Marion. Newberry Oconee. Orangeburg. Richland. Spartanburg.	Aiken. Anderson. Beaufort. Berkeley. Charleston. Cherokee. Darlington. Dillon. Dorchester. Fairfield. Florence. Georgetown. Greenville. Greenwood. Horry. Kershaw. Lexington. Marion. Newberry. Oconee. Orangeburg. Richland. Spartanburg.

SOUTH DAKOTA

1927	1928	1929	1930	1931
Brown. Pennington.	Pennington.	Pennington.	Pennington.	Pennington.

TENNESSEE

1927	1928	1929	1930	1931
Blount. Davidson. Dyer. Gibson. Hamilton. Lauderdale. Montgomery. Obion. Roane. Rutherford. Sevier. Shelby. Weakley. Williamson.	Blount. Bradley. Davidson. Dyer. Gibson. Hamilton. Lake. Lauderdale. Montgomery. Obion. Roane. Rutherford. Sevier. Shelby. Washington. Weakley. Williamson.	Blount. Bradley. Carter. Davidson. Dyer. Gibson. Greene. Hamilton. Knox. Lake. Lauderdale. Monroe. Montgomery. Obion. Roane. Rutherford. Sevier. Shelby. Sullivan. Washington. Weakley. Williamson. Wilson.	Bledsoe. Blount. Bradley. Carter. Clay. Davidson. Dyer. Fentress. Gibson. Giles. Greene. Grundy. Hamilton. Hardeman. Jackson. Knox. Lake. Lauderdale Lincoln. Meigs. Monroe. Montgomery. Obion. Overton. Pickett. Rhea. Roane. Rutherford. Sequatchie. Sevier. Shelby. Sullivan. Sumner.	Bledsoe. Blount. Bradley. Carter. Clay. Davidson. Dyer. Fentress. Gibson. Giles. Greene. Grundy. Hamilton. Hardeman. Humphreys. Jackson. Knox. Lake. Lauderdale. Lewis. Lincoln. Maury. Meigs. Monroe. Montgomery. Obion. Overton. Pickett. Rhea. Roane. Rutherford. Sequatchie. Sevier.

TABLE 1.—*List of counties or districts in which as of January 1, 1927, 1928, 1929, 1930, and 1931, respectively, rural sections were provided with health service under whole-time local health officers*—Continued

TENNESSEE—Continued

1927	1928	1929	1930	1931
			Tipton. Washington. Weakley. Williamson. Wilson.	Shelby. Sullivan. Sumner. Tipton. Unicoi. Washington. Weakley. Williamson. Wilson.

TEXAS

1927	1928	1929	1930	1931
Cameron. Hidalgo. Jefferson. McLennan. Tarrant.	Cameron. Hidalgo. McLennan. Tarrant.	Cameron. Hidalgo. McLennan. Tarrant.	Cameron. Hidalgo. Jefferson. McLennan. Nolan. Tarrant.	Cameron. Hidalgo. Jefferson. McLennan. Nolan. Potter. Tarrant.

UTAH

1927	1928	1929	1930	1931
Box Elder. Davis. Morgan. Summit. Wasatch. Weber.	Box Elder. Davis. Summit. Utah. Wasatch.	Box Elder. Davis. Utah.	Box Elder. Davis. Utah.	Davis. Utah.

VIRGINIA

1927	1928	1929	1930	1931
Accomac. Albemarle. Arlington. Augusta. Brunswick. Fairfax. Halifax. Henrico. Isle of Wight. James City. Nansemond. Northampton. Southampton. Sussex. Wise.	Accomac. Albemarle. Arlington. Augusta. Brunswick. Halifax. Henrico. Isle of Wight. Nansemond. Norfolk. Northampton. Princess Anne. Rockbridge. Southampton.	Accomac. Albemarle. Arlington. Augusta. Brunswick. Greensville. Halifax. Henrico. Isle of Wight. Nansemond. Norfolk. Northampton. Princess Anne. Rockbridge. Southampton. Wise.	Accomac. Albemarle. Arlington. Augusta. Brunswick. Fairfax. Greensville. Halifax. Henrico. Isle of Wight. Nansemond. Norfolk. Northampton. Princess Anne. Rockbridge. Southampton. Wise.	Accomac. Albemarle. Amelia.[1] Appomattox.[1] Arlington. Augusta. Brunswick. Buckingham.[1] Charlotte.[1] Cumberland.[1] Fairfax. Greensville. Halifax. Henrico. Isle of Wight. Lunenburg.[1] Nansemond. Norfolk. Northampton. Nottaway.[1] Powhatan.[1] Prince Edward.[1] Princess Anne. Rockbridge. Southampton. Wise.

WASHINGTON

1927	1928	1929	1930	1931
Chelan. King. Snohomish. Spokane. Walla Walla. Yakima.	Chelan. King. Snohomish. Spokane. Walla Walla. Whitman. Yakima.	Chelan. King. Snohomish. Spokane. Walla Walla. Whitman. Yakima.	Chelan. Clark. King. Snohomish. Spokane. Walla Walla. Whitman. Yakima.	Chelan. Clark. King. Snohomish. Spokane. Walla Walla. Whitman. Yakima.

[1] Included in 1 district of 9 counties.

TABLE 1.—*List of counties or districts in which as of January 1, 1927, 1928, 1929, 1930, and 1931, respectively, rural sections were provided with health service under whole-time local health officers*—Continued

WEST VIRGINIA

1927	1928	1929	1930	1931
Boone.	Berkeley.	Berkeley.	Berkeley.	Berkeley.
Brooke.	Boone.	Boone.	Boone.	Boone.
Gilmer.	Brooke.	Brooke.	Brooke.	Brooke.
Hancock.	Gilmer.	Fayette.	Fayette.	Fayette.
Harrison.	Hancock.	Gilmer.	Gilmer.	Gilmer.
Kanawha.	Harrison.	Hancock.	Hancock	Hancock.
Logan.	Kanawha.	Harrison.	Harrison.	Harrison.
Marion.	Lewis.	Kanawha.	Kanawha.	Kanawha.
Marshall.	Logan.	Logan.	Logan.	Logan.
Ohio.	Marion.	Marion.	Marion.	Marion.
Preston.	Marshall.	Ohio.	Monongalia.	Marshall.
Roane.	Ohio.	Preston.	Ohio.	Monongalia.
Wood.	Preston.	Raleigh	Preston.	Ohio.
	Wood.	Wood.	Raleigh.	Preston.
			Wood.	Raleigh.
				Wood.

WYOMING

1927	1928	1929	1930	1931
Natrona.	Natrona.	Natrona.		

Résumé of Table 1

State	Number of counties Jan. 1					Increase or decrease in 1927	Increase or decrease in 1928	Increase or decrease in 1929	Increase or decrease in 1930
	1927	1928	1929	1930	1931				
Alabama	30	33	50	51	54	+3	+17	+1	+3
Arizona	2	3	3	3	6	+1	----	----	+3
Arkansas	3	21	24	21	24	+18	+3	-3	+3
California	9	9	11	12	13	----	+2	+1	+1
Colorado	1	1	1	1	1	----	----	----	----
Connecticut	1	1	1	1	1	----	----	----	----
Delaware	----	----	----	----	3	----	----	----	+3
Florida	3	3	3	2	3	----	----	-1	+1
Georgia	24	27	31	34	30	+3	+4	+3	-4
Idaho	----	----	----	2	1	----	----	+2	-1
Illinois	3	3	4	3	2	----	+1	-1	-1
Iowa	1	----	----	----	2	-1	----	----	+2
Kansas	9	10	10	11	12	+1	----	+1	+1
Kentucky	9	32	39	45	43	+23	+7	+6	-2
Louisiana	10	28	29	31	31	+18	+1	+2	----
Maine	5	4	4	4	4	-1	----	----	----
Maryland	6	8	9	11	14	+2	+1	+2	+3
Massachusetts	1	1	1	1	1	----	----	----	----
Michigan	----	----	[1] 3	4	24	----	+3	+1	+20
Minnesota	1	1	1	1	1	----	----	----	----
Mississippi	18	24	29	28	28	+6	+5	-1	----
Missouri	12	14	12	13	13	+2	-2	+1	----
Montana	3	3	3	4	4	----	----	+1	----
New Mexico	9	8	7	7	8	-1	-1	----	+1
New York	1	1	2	4	4	----	+1	+2	----
North Carolina	37	37	39	38	39	----	+2	-1	+1
Ohio	47	47	45	46	46	----	-2	+1	----
Oklahoma	9	9	10	9	9	----	+1	-1	----
Oregon	5	7	7	7	8	+2	----	----	+1
Pennsylvania	----	----	----	----	3	----	----	----	+3
South Carolina	16	16	20	23	23	----	+4	+3	----
South Dakota	2	1	1	1	1	-1	----	----	----
Tennessee	14	17	23	38	42	+3	+6	+15	+4
Texas	5	4	4	6	7	-1	----	+2	+1
Utah	6	5	3	3	2	-1	-2	----	-1
Virginia	15	14	16	17	26	-1	+2	+1	+9
Washington	6	7	7	8	8	+1	----	+1	----
West Virginia	13	14	14	15	16	+1	----	+1	+1
Wyoming	1	1	1	----	----	----	----	-1	----
Total	337	416	467	505	557	+79	+51	+38	+52

The accompanying map shows the location of the counties or districts in the United States in the rural sections of which local health service under the direction of whole-time local (county or district) health officers was in operation on January 1, 1931.

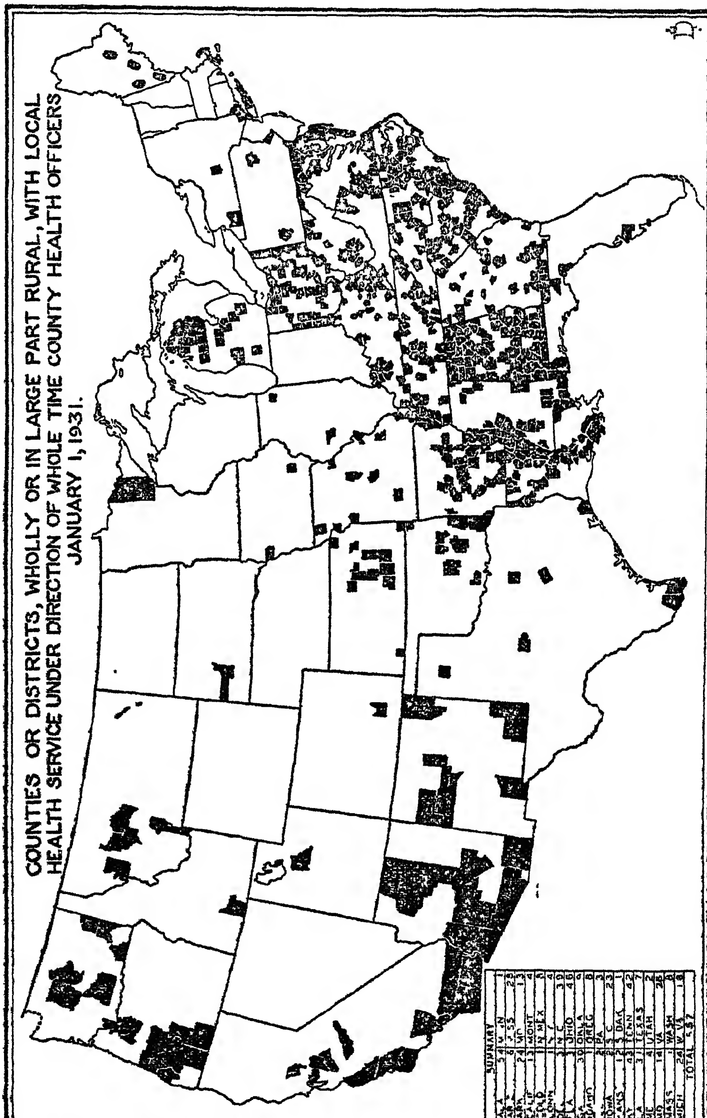

FIGURE 1.—Rural areas having whole-time health officers, 1931

Within the period January 1, 1930, to January 1, 1931, whole-time county or (local) district health service was established in 61 units

and was discontinued in 9—a net gain of 52. The largest gain in one State was that of 20 in Michigan. Delaware took the lead in the percentage of rural population under whole-time local health service, all of its three counties having been provided with full-time local organizations financed by the State. Of the States in which the counties maintain the health organizations, with or without assistance from the State health department or other sources, Alabama, with 85.49, had the highest percentage of rural population under whole-time service.

TABLE 2.—*Percentage of rural population having on January 1, 1931, local health service under whole-time local (county or district) health officers*

State	Rural population (census 1930)	Rural population with local health service under direction of whole-time health officers	Percentage of rural population with local health service under direction of whole-time health officers
Alabama	1,901,975	1,626,099	85.49
Arizona	285,717	181,056	63.37
Arkansas	1,471,604	601,615	40.88
California	1,516,655	714,727	47.13
Colorado	515,909	13,771	2.67
Connecticut	475,133	100,054	21.06
Delaware	115,234	115,234	100.00
Florida	708,433	33,422	4.72
Georgia	2,013,016	535,138	26.58
Idaho	315,525	21,041	6.67
Illinois	1,994,927	39,853	2.00
Indiana	1,442,611	0	0
Iowa	1,491,647	37,494	2.52
Kansas	1,151,165	186,708	16.22
Kentucky	1,815,563	792,448	43.65
Louisiana	1,268,061	707,551	55.80
Maine	475,917	31,327	6.58
Maryland	656,657	500,451	76.21
Massachusetts	418,188	13,510	3.23
Michigan	1,540,250	403,537	26.20
Minnesota	1,306,337	48,313	3.70
Mississippi	1,670,971	684,216	40.95
Missouri	1,770,248	493,291	27.87
Montana	356,570	35,139	9.85
Nebraska	891,856	0	0
Nevada	56,594	0	0
New Hampshire	192,214	0	0
New Jersey	702,090	0	0
New Mexico	316,501	106,528	33.66
New York	2,066,114	261,097	12.64
North Carolina	2,360,429	1,302,065	55.16
North Dakota	567,530	0	0
Ohio	2,139,326	1,316,535	61.54
Oklahoma	1,574,359	313,439	19.91
Oregon	464,040	214,363	46.19
Pennsylvania	3,097,139	456,142	14.73
Rhode Island	52,068	0	0
South Carolina	1,367,685	826,877	60.46
South Dakota	561,942	9,675	1.72
Tennessee	1,720,018	901,758	52.43
Texas	3,435,367	182,539	5.31
Utah	241,583	29,312	12.13
Vermont	240,845	0	0
Virginia	1,636,314	528,041	32.27
Washington	678,857	301,817	44.46
West Virginia	1,237,701	550,270	44.46
Wisconsin	1,385,163	0	0
Wyoming	155,468	0	0
Total	53,819,525	15,216,453	28.27

Of the 548 counties or districts with local health service under whole-time local (county or district) health officers at the beginning

of the present calendar year, 488, or 89 per cent, are receiving financial assistance for the support of their local health service from one or more of the following agencies: The State board of health, the United States Public Health Service, the Rockefeller Foundation.

Table 2 presents, by States, the percentage of rural population having local health service under the direction of whole-time local

STATE	WHOLE-TIME COUNTY OR LOCAL DISTRICT HEALTH UNITS JANUARY 1					PERCENTAGE OF RURAL POPULATION SERVED AS OF JANUARY 1, 1931
	1927	1928	1929	1930	1931	%
DELAWARE	0	0	0	0	3	100 00
ALABAMA	30	33	50	51	54	85 49
MARYLAND	6	8	9	11	14	76.21
ARIZONA	2	3	3	3	6	63 37
OHIO	47	47	45	46	46	61 54
S CAROLINA	16	16	20	23	23	60 46
LOUISIANA	10	28	29	31	31	55 80
N CAROLINA	37	37	39	38	39	55.16
TENNESSEE	14	17	23	36	42	52 43
CALIFORNIA	9	9	11	12	13	47 13
OREGON	5	7	7	7	8	46 19
WEST VIRGINIA	13	14	14	15	16	44 46
WASHINGTON	6	7	7	8	8	44 46
KENTUCKY	9	32	39	45	43	43 65
MISSISSIPPI	18	24	29	28	28	40 95
ARKANSAS	3	21	24	21	24	40 88
NEW MEXICO	9	8	7	7	8	33 66
VIRGINIA	15	14	16	17	26	32 27
MISSOURI	12	14	12	13	13	27 87
GEORGIA	24	27	31	34	30	26 58
MICHIGAN	0	0	3	4	24	26 20
CONNECTICUT	1	1	1	1	1	21 06
OKLAHOMA	9	9	10	9	9	19 91
KANSAS	9	10	10	11	12	16 22
PENNSYLVANIA	0	0	0	0	3	14 73
NEW YORK	1	1	2	4	4	12 64
UTAH	6	5	3	3	2	12 13
MONTANA	3	3	3	4	4	9 85
IDAHO	0	0	0	2	1	6 67
MAINE	5	4	4	4	4	6 58
TEXAS	5	4	4	6	7	5 31
FLORIDA	3	3	3	2	3	4 72
MINNESOTA	1	1	1	1	1	3 70
MASS.	1	1	1	1	1	3 23
COLORADO	1	1	1	1	1	2 67
IOWA	1	0	0	0	2	2 52
ILLINOIS	3	3	4	3	2	2 00
S DAKOTA	2	1	1	1	1	1 72
WYOMING	1	1	1	0	0	0
TOTALS	337	414	467	505	557	28 27

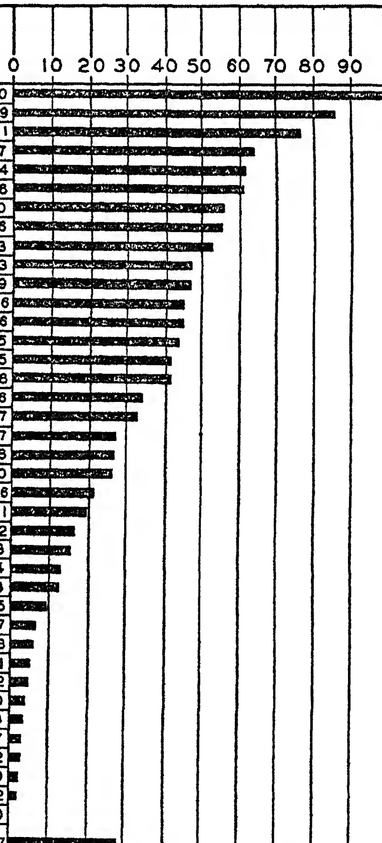

FIGURE 2.—Number of whole-time county health units, by States, 1927-1931, and percentage of rural population served on January 1, 1931

(county or district) health officers at the beginning of 1931. It will be noted that over 70 per cent of our rural population is as yet unprovided with local health service approaching adequacy.

The accompanying chart shows, by States, the number of counties or local districts with health service under the direction of whole-

time county or local district health officers as of January 1, 1927, 1928, 1929, 1930, and 1931, and the percentage of the rural population of each State receiving such service on January 1, 1931.

COURT DECISION RELATING TO PUBLIC HEALTH

License requirement for wholesale food establishments upheld.—(Illinois Supreme Court; City of Chicago *v.* Arbuckle Bros., 176 N. E. 761; decided June 18, 1931.) Section 2004 of the Chicago municipal code defined the term "wholesale food establishment" and provided that "No person, firm or corporation shall establish, maintain or operate any wholesale food establishment without first having obtained a license as hereinafter required." Section 2009 of the code set forth the sanitary requirements governing wholesale food establishments. The defendant, a corporation engaged in the business of receiving, packing, and selling, at wholesale, coffees, teas, spices, and flavoring extracts, was convicted in the municipal court of conducting a wholesale food establishment without a license, in violation of section 2004. On appeal to the supreme court, the question presented for determination was the validity of such section.

Among the powers given to the city council by statute were the following:

50. To regulate the sale of meats, poultry, fish, butter, cheese, lard, vegetables, and all other provisions, and to provide for place and manner of selling the same and to control the location thereof.

53. To provide for and regulate the inspection of meats, poultry, fish, butter, cheese, lard, vegetables, cotton, tobacco, flour, meal and other provisions.

78. To do all acts, make all regulations, which may be necessary or expedient for the promotion of health or the suppression of disease.

The court laid down the proposition that "A municipal corporation has no power to legislate upon any subject except by the express provision of a statute giving it the power, or by clear implication from such a statute as necessarily incident to the powers expressly granted," but, after a consideration of the powers set forth, declared that "coffee, tea, spices, and flavoring extracts we regard as within the meaning of 'other provisions' mentioned in paragraphs 50 and 53, whose inspection and sale and the place and manner thereof the city council may regulate and provide for." It stated that the power to regulate included the power to license, and affirmed the judgment of the trial court.

DEATHS DURING WEEK ENDED AUGUST 22, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended August 22, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended August 22, 1931	Corresponding week, 1930
Policies in force	74, 973, 572	75, 743, 912
Number of death claims	12, 270	13, 050
Death claims per 1,000 policies in force, annual rate	8. 5	9. 0
Death claims per 1,000 policies, first 34 weeks of year, annual rate	10. 1	9. 9

Deaths[1] from all causes in certain large cities of the United States during the week ended August 22, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

The rates published in this summary are based upon midyear population estimates derived from the 1930 census

City	Week ended Aug. 22, 1931				Corresponding week, 1930		Death rate[2] for the first 34 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Total (82 cities)	6, 882	10. 1	614	[4] 48	9. 5	679	12. 4	12. 3
Akron	39	7. 9	5	49	4. 9	3	8. 0	8. 0
Albany[5]	25	10. 1	2	40	13. 1	1	14. 0	15. 2
Atlanta	90	16. 9	9	92	8. 1	6	15. 6	16. 2
White	47	----	4	63	----	1	----	----
Colored	43	(6)	5	144	(6)	5	(6)	(6)
Baltimore[5]	173	11. 1	21	71	10. 0	17	14. 9	14. 4
White	119	----	14	61	----	13	----	----
Colored	54	(6)	7	109	(6)	4	(6)	(6)
Birmingham	61	11. 8	8	80	10. 0	15	14. 1	14. 2
White	25	----	3	51	----	8	----	----
Colored	36	(6)	5	122	(6)	7	(6)	(6)
Boston	178	11. 8	20	57	11. 3	20	14. 6	14. 5
Bridgeport	18	6. 4	3	50	9. 6	0	11. 4	11. 4
Buffalo	131	11. 8	11	45	8. 6	9	13. 6	13. 3
Cambridge	21	9. 6	2	40	9. 2	2	12. 6	12. 2
Camden	29	12. 7	5	87	7. 5	3	14. 8	13. 9
Canton	17	8. 3	1	23	8. 4	3	10. 5	10. 4
Chicago[5]	553	8. 3	52	46	8. 5	63	11. 2	10. 7
Cincinnati	111	12. 7	10	60	12. 7	8	16. 4	15. 9
Cleveland	172	9. 8	10	29	10. 2	27	11. 5	11. 5
Columbus	68	12. 0	5	49	8. 9	3	14. 1	16. 2
Dallas	50	9. 6	7	----	12. 1	9	11. 8	12. 1
White	30	----	4	----		7		
Colored	20	(6)	3	----	(6)	2	(6)	(6)
Dayton	39	9. 8	2	28	9. 8	2	12. 2	10. 5
Denver	60	10. 7	5	48	15. 7	15	14. 3	14. 9
Des Moines	19	6. 9	0	0	10. 6	1	11. 4	12. 1
Detroit	289	7. 5	24	38	7. 5	35	8. 6	9. 7
Duluth	15	7. 7	1	25	9. 8	2	11. 1	11. 4
El Paso	19	9. 4	5	----	17. 7	9	16. 4	18. 2
Erie	26	11. 5	1	19	12. 6	3	10. 8	11. 6
Fall River[7] [5]	21	9. 5	3	68	7. 2	1	11. 8	12. 4
Flint	19	6. 0	3	38	8. 3	9	7. 3	9. 5
Fort Worth	24	7. 5	4	----	11. 1	9	11. 1	11. 4
White	17	----	2	----		7		
Colored	7	(6)	2	----	(6)	2	(6)	(6)
Grand Rapids	23	7. 0	1	15	5. 5	2	9. 3	10. 6
Houston	73	12. 3	11	----	11. 3	7	11. 4	12. 4
White	47	----	8	----	----	6	----	----
Colored	26	(6)	3	----	(6)	1	(6)	(6)
Indianapolis	103	14. 5	12	99	12. 3	10	14. 3	15. 1
White	84	----	9	85	----	8	----	----
Colored	19	(6)	3	201	(6)	2	(6)	(6)

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended August 22, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Aug. 22, 1931				Corresponding week, 1930		Death rate for the first 34 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Jersey City	49	8.0	5	44	7.1	5	12.0	11.7
Kansas City, Kans.	25	10.6	4	82	14.5	0	13.2	11.4
White	22		4	98		0		
Colored	3	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo.	64	8.2	6	46	12.1	6	13.7	13.6
Knoxville	16	7.6	2	43	11.8	5	12.8	14.3
White	12		2	48		0		
Colored	4	(6)	0	0	(6)	5	(6)	(6)
Long Beach	23	7.9	0	0	9.8	3	10.0	10.1
Los Angeles	240	9.5	15	44	8.2	12	10.9	11.2
Louisville	83	14.0	11	94	10.0	5	14.7	14.0
White	65		6	59		5		
Colored	18	(6)	5	331	(6)	0	(6)	(6)
Lowell [7]	15	7.8	1	25	15.0	5	12.8	14.0
Lynn	10	5.1	0	0	7.6	0	10.0	11.0
Memphis	78	15.7	11	116	15.2	9	16.8	17.9
White	39		5	83		5		
Colored	39	(6)	6	174	(6)	4	(6)	(6)
Miami	31	14.4	2	51	7.5	1	12.2	11.5
White	20		1	35		1		
Colored	11	(6)	1	88	(6)	0	(6)	(6)
Milwaukee	81	7.2	7	30	7.0	6	9.7	9.8
Minneapolis	80	8.8	2	13	6.4	3	11.7	10.8
Nashville	40	13.4	10	149	13.9	4	17.3	17.1
White	23		5	100		3		
Colored	17	(6)	5	295	(6)	1	(6)	(6)
New Bedford [7]	18	8.3	2	53	6.0	0	12.6	11.4
New Haven	36	11.5	3	57	9.9	2	12.6	13.4
New Orleans	135	15.1	18	99	15.5	25	17.3	17.9
White	83		11	91		15		
Colored	52	(6)	7	114	(6)	10	(6)	(6)
New York	1,310	9.6	107	45	8.0	108	11.7	11.2
Bronx Borough	172	6.7	13	29	5.7	11	8.6	8.2
Brooklyn Borough	466	9.3	36	38	7.6	47	10.7	10.3
Manhattan Borough	501	14.4	47	80	11.3	41	17.7	16.7
Queens Borough	135	6.1	11	30	5.4	5	7.5	7.3
Richmond Borough	36	11.5	0	0	11.5	4	14.0	14.7
Newark, N. J.	75	8.8	4	21	7.8	5	12.0	12.5
Oakland	49	8.7	3	38	10.0	4	10.7	11.1
Oklahoma City	25	6.6	3	41	10.6	6	11.2	10.8
Omaha	36	8.7	4	45	9.2	3	14.2	14.1
Paterson	42	15.8	1	17	8.3	4	13.9	12.5
Peoria	17	8.2	0	0	10.4	1	13.1	12.9
Philadelphia	388	10.3	45	65	10.9	39	13.7	13.0
Pittsburgh	138	10.6	15	52	9.4	8	15.1	14.2
Portland, Oreg.	47	8.0	1	12	10.7	3	11.8	12.6
Providence	50	10.2	2	18	7.4	3	13.2	13.5
Richmond	44	12.4	2	29	12.2	2	16.1	15.4
White	25		1	22		1		
Colored	19	(6)	1	43	(6)	1	(6)	(6)
Rochester	72	11.3	5	46	10.3	8	12.2	11.8
St. Louis	194	12.2	10	34	10.6	21	16.0	14.8
St. Paul	52	9.8	5	52	7.1	2	11.2	10.3
Salt Lake City [5]	32	11.7	3	45	10.7	2	12.4	12.8
San Antonio	48	10.4	5	(6)	16.3	11	15.1	17.6
San Diego	41	13.7	1	20	12.2	1	13.9	14.5
San Francisco	204	16.4	9	60	11.9	4	13.3	13.2
Schenectady	23	12.5	3	88	10.3	2	10.8	11.5
Seattle	68	9.5	1	9	12.4	3	11.6	11.1
Somerville	15	7.4	3	112	8.0	1	9.4	10.1
South Bend	13	6.3	3	75	7.9	1	8.3	9.1
Spokane	18	8.1	2	52	8.6	1	12.5	12.5
Springfield, Mass.	19	6.5	0	0	9.0	4	12.1	12.5
Syracuse	45	11.0	3	36	10.9	7	11.9	12.0
Tacoma	9	4.4	0	0	12.2	2	12.2	12.9
Toledo	57	10.1	2	18	9.3	1	12.3	12.9
Trenton	34	14.3	1	17	13.1	4	17.1	17.1
Utica	22	11.2	4	104	8.7	1	14.5	15.3

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended August 22, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Aug. 22, 1931				Corresponding week, 1930		Death rate for the first 34 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Washington, D. C.	128	13.5	9	50	12.2	19	16.2	15.6
White	70		2	16		12		
Colored	58	(6)	7	120	(6)	7	(6)	(6)
Waterbury	19	9.8	5	151	10.4	3	9.8	10.3
Wilmington, Del.[7]	27	13 2	4	86	11.7	1	14.5	14 7
Worcester	27	7.1	1	14	10.7	4	12.6	13.3
Yonkers	28	10.5	3	79	5.8	1	8 9	8.3
Youngstown	26	7.8	3	42	7.9	4	10.6	10.4

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32, and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended August 29, 1931, and August 30, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 29, 1931, and August 30, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930
New England States:								
Maine		3	1	2	3	3	0	0
New Hampshire	1	1				2	0	0
Vermont		1			1		0	0
Massachusetts	29	56	4	1	18	47	2	2
Rhode Island		4			18		2	0
Connecticut	3	6		2	3	2	1	1
Middle Atlantic States:								
New York	53	52	[1] 4	[1] 5	96	75	5	8
New Jersey	17	28	1	8	18	19	2	3
Pennsylvania	35	36			69	48	13	17
East North Central States:								
Ohio	32	24	12	9	37	12	4	6
Indiana	10	8	12	9	17	1	5	5
Illinois	52	68		4	25	10	3	5
Michigan	14	23			12	22	2	4
Wisconsin	10	5	10	18	18	44	2	4
West North Central States:								
Minnesota	5	14	1	3	3	2	2	1
Iowa	1	6			2		1	0
Missouri	22	19	3		3	10	3	5
North Dakota	2	4			2		0	0
South Dakota	4	4			1		1	0
Nebraska	5	1		1	3	6	1	0
Kansas	6	11			1	15	0	4
South Atlantic States:								
Delaware		1				1		0
Maryland [2]	13	16	1	7	5	4	2	1
District of Columbia	9	4	2		1	1	0	0
Virginia								
West Virginia	7	9		4	31	1	3	0
North Carolina [3]	42	67	3		10	4	0	0
South Carolina [3]	14	21	144	138	5		0	0
Georgia [3]	23	16	2	4	31	4	0	0
Florida	6	5	1			4	0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 15 cases: 1 case in North Carolina; 1 case in South Carolina; 5 cases in Georgia; 3 cases in Alabama; and 5 cases in Texas.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 29, 1931, and August 30, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930
East South Central States:								
Kentucky	24	-	-	-	20	-	2	0
Tennessee	16	10	9	4	3	-	2	1
Alabama [3]	57	16	6	6	4	27	0	2
Mississippi	50	14	-	-	-	-	1	1
West South Central States:								
Arkansas	22	1	5	9	2	-	1	0
Louisiana	24	8	1	6	5	3	0	3
Oklahoma [4]	23	3	12	2	-	1	0	3
Texas [3]	16	13	3	18	3	2	0	0
Mountain States:								
Montana	5	-	-	-	13	2	0	2
Idaho	1	-	-	-	1	-	1	0
Wyoming	-	-	-	-	1	-	0	0
Colorado	3	12	-	-	5	5	0	2
New Mexico	-	10	-	-	-	10	0	-
Arizona	-	2	-	-	-	-	2	1
Utah [2]	1	-	3	4	-	-	0	2
Pacific States:								
Washington	3	2	-	-	4	6	0	0
Oregon	5	3	10	1	2	8	0	0
California	30	24	15	15	49	44	2	4

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930
New England States:								
Maine	6	5	7	12	0	0	1	5
New Hampshire	4	0	1	1	0	0	0	2
Vermont	5	0	2	2	4	0	0	1
Massachusetts	135	23	65	42	0	0	10	12
Rhode Island	20	1	6	4	0	0	6	3
Connecticut	134	3	9	8	0	0	9	1
Middle Atlantic States:								
New York	612	29	93	42	2	0	62	30
New Jersey	103	1	26	16	0	0	11	19
Pennsylvania	9	7	51	53	0	0	41	55
East North Central States:								
Ohio	18	28	103	50	3	5	29	39
Indiana	3	4	16	10	9	15	17	19
Illinois	38	19	63	60	11	8	43	41
Michigan	76	5	67	41	7	7	14	21
Wisconsin	61	5	14	27	0	2	3	9
West North Central States:								
Minnesota	39	19	16	14	1	1	4	5
Iowa	8	6	8	5	8	6	3	1
Missouri	4	19	16	17	2	1	14	13
North Dakota	0	1	1	5	3	1	10	16
South Dakota	0	9	1	1	1	4	4	2
Nebraska	1	6	6	5	1	4	5	0
Kansas	1	48	18	12	0	7	7	18
South Atlantic States:								
Delaware	-	0	3	1	-	0	3	8
Maryland [2]	1	5	12	9	0	0	32	38
District of Columbia	0	0	3	4	0	0	2	[5] 12
Virginia	2	-	-	-	-	-	-	-
West Virginia	10	1	13	10	0	7	38	73
North Carolina [3]	4	2	33	45	0	1	32	40
South Carolina [3]	2	0	11	8	0	0	69	48
Georgia [3]	7	0	40	4	7	0	65	35
Florida	0	0	1	5	0	0	1	1

[2] Week ended Friday.
[3] Typhus fever, 1931, 15 cases: 1 case in North Carolina; 1 case in South Carolina; 5 cases in Georgia; 3 cases in Alabama; and 5 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa, and for 1930 are exclusive of Tulsa only.
[5] Includes nonresidents.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended August 29, 1931, and August 30, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 29, 1931	Week ended Aug 30, 1930	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930	Week ended Aug. 29, 1931	Week ended Aug 30, 1930	Week ended Aug. 29, 1931	Week ended Aug. 30, 1930
East South Central States:								
Kentucky	1	1	19	2	5	3	47	39
Tennessee	1	2	27	21	5	0	79	54
Alabama [3]	0	3	23	2	0	1	39	30
Mississippi	2	4	14	1	3	0	46	27
West South Central States:								
Arkansas	1	8	3	3	9	2	65	38
Louisiana	0	13	16	1	2	0	55	36
Oklahoma [4]	0	8	8	4	4	11	31	43
Texas [3]	1	1	8	9	1	7	14	12
Mountain States:								
Montana	3	0	10	5	2	0	0	1
Idaho	0	0	7	1	0	0	3	0
Wyoming	1	2	0	3	0	0	1	1
Colorado	0	2	15	8	6	1	2	15
New Mexico	1	2	4	1	0	10	6	15
Arizona	0	0	0	1	0	0	5	11
Utah [2]	0	0	2	3	0	0	1	4
Pacific States:								
Washington	0	1	11	9	25	11	7	5
Oregon	1	2	9	7	11	3	6	5
California	6	49	54	27	5	5	19	13

[2] Week ended Friday.
[3] Typhus fever, 1931, 15 cases: 1 case in North Carolina; 1 case in South Carolina; 5 cases in Georgia; 3 cases in Alabama; and 5 crses in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa, and for 1930 are exclusive of Tulsa only.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet feve	Smallpox	Typhoid fever
June, 1931										
Delaware	--------	6	1	--------	267	--------	0	20	0	1
July, 1931										
Arkansas	1	9	--------	183	12	484	0	9	25	155
California	7	233	58	13	936	11	24	210	43	80
Montana	1	2	3	--------	54	--------	4	22	8	14
Nevada	1	1	1	1	27	--------	0	2	0	3
Oregon	1	10	29	1	44	--------	0	21	49	17
Rhode Island	--------	30	1	--------	378	--------	10	47	0	1
South Dakota	--------	13	3	--------	6	--------	4	22	8	17
Texas	3	69	4	1,054	--------	5	5	83	--------	127
Virginia	6	46	312	60	234	97	9	71	12	251

June, 1931

Delaware:	Cases
Chicken pox	8
Mumps	18
Whooping cough	26

July, 1931

	Cases
Actinomycosis:	
California	2
South Dakota	1
Anthrax:	
Oregon	1
Chicken pox:	
Arkansas	16
California	316
Montana	34
Oregon	44
Rhode Island	7
South Dakota	20
Virginia	71

	Cases
Diarrhea and dysentery:	
Virginia	2,377
Dysentery:	
California (amebic)	3
California (bacillary)	17
Food poisoning:	
California	92
German measles.	
California	25
Montana	4
Rhode Island	1
Granuloma, coccidioidal:	
California	1
Hookworm disease:	
Arkansas	3
Impetigo contagiosa.	
Oregon	12
Leprosy:	
California	1
Lethargic encephalitis:	
California	3
Mumps:	
Arkansas	24
California	326
Montana	2
Oregon	83
Rhode Island	56
South Dakota	8
Ophthalmia neonatorum:	
California	2
Montana	1
Paratyphoid fever:	
California	7
Oregon	1
Texas	8
Rabies in animals:	
California	43
Rocky Mountain spotted or tick fever:	
Montana	3
Nevada	2
Oregon	1
Virginia	1

	Cases
Scabies:	
Oregon	1
Septic sore throat:	
California	10
Montana	8
Oregon	8
Rhode Island	2
Tetanus:	
California	1
Tick paralysis:	
Montana	1
Trachoma:	
Arkansas	3
California	10
Oregon	1
South Dakota	4
Trichinosis:	
California	6
Tularaemia.	
Arkansas	2
California	4
Montana	1
Nevada	5
Virginia	2
Typhus fever:	
Virginia	7
Undulant fever:	
California	12
Montana	1
Oregon	1
Virginia	2
Vincent's angina:	
Oregon	15
Whooping cough:	
Arkansas	42
California	820
Montana	58
Nevada	9
Oregon	56
Rhode Island	43
South Dakota	36
Virginia	489

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of April, 1931, by departments of health of certain States to other State health departments

Disease	California	Connecticut	Florida	Illinois	Kansas	Minnesota	New York	Oregon
Chicken pox							1	
Gonorrhea						2		
Measles							2	
Scarlet fever							2	
Smallpox				1				
Syphilis					7	2		
Tuberculosis	2			1		35		3
Typhoid fever	1	1	1					
Whooping cough							1	

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,140,000. The estimated population of the 89 cities reporting deaths is more than 31,595,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended August 22, 1931, and August 23, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	559	574	
96 cities	192	210	371
Measles:			
45 States	574	559	
96 cities	185	174	
Meningococcus meningitis:			
46 States	88	94	
96 cities	31	38	
Poliomyelitis:			
46 States	1,135	332	
Scarlet fever:			
46 States	822	617	
96 cities	278	205	228
Smallpox:			
46 States	103	149	
96 cities	7	12	12
Typhoid fever:			
46 States	960	1,009	
96 cities	133	118	160
Deaths reported			
Influenza and pneumonia:			
89 cities	303	283	
Smallpox:			
89 cities	0	0	

City reports for week ended August 22, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	1	0		0	0	0	1
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	0	1		0	1	0	0
Vermont:								
Barre	0	0	0		0	0	0	1
Burlington	1	0	0		0	0	1	0
Massachusetts:								
Boston	7	13	19		0	5	4	8
Fall River	0	1	2		0	4	0	1
Springfield	0	1	0		0	1	4	0
Worcester	0	3	4		0	1	4	1
Rhode Island:								
Pawtucket	0	0	0		0	0	0	0
Providence	0	2	1		0	14	1	1
Connecticut:								
Bridgeport	0	2	1	1	1	1	0	1
Hartford	0	2	1		0	0	1	1
New Haven	0	0	0		0	0	1	0

City reports for week ended August 22, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
MIDDLE ATLANTIC								
New York:								
Buffalo	1	7	3	1	0	0	2	6
New York	14	83	30	6	2	25	12	83
Rochester	1	2	1	----------	0	13	0	3
Syracuse	0	1	1	----------	0	6	0	1
New Jersey:								
Camden	0	2	1	----------	0	1	0	0
Newark	2	6	0	----------	0	3	4	3
Trenton	0	0	0	----------	0	5	1	0
Pennsylvania:								
Philadelphia	6	26	2	3	1	2	6	19
Pittsburgh	0	9	5	----------	1	1	6	10
Reading	0	0	0	----------	0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	3	3	----------	0	0	0	4
Cleveland	4	15	2	----------	0	12	12	9
Columbus	0	2	1	----------	0	0	0	1
Toledo	1	3	3	----------	0	2	0	2
Indiana:								
Fort Wayne	0	1	2	----------	0	0	0	1
Indianapolis	0	2	0	----------	0	0	2	9
South Bend	0	0	0	----------	0	1	0	1
Terre Haute	----------	1	----------	----------	----------	----------	----------	----------
Illinois:								
Chicago	11	50	26	2	3	29	7	16
Springfield	0	0	0	----------	0	0	0	0
Michigan:								
Detroit	3	23	6	----------	0	2	5	9
Flint	1	1	1	----------	0	2	1	0
Grand Rapids	0	0	0	----------	0	0	0	0
Wisconsin:								
Kenosha	0	0	0	----------	0	1	5	0
Madison	1	1	5	----------	----------	0	8	----------
Milwaukee	10	6	3	----------	0	14	11	2
Racine	0	0	0	----------	0	0	10	0
Superior	1	0	1	----------	0	0	1	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	2	0	0	----------	0	1	0	0
Minneapolis	1	9	4	----------	1	0	2	0
St. Paul	----------	3	----------	----------	----------	----------	----------	----------
Iowa:								
Davenport	0	1	0	----------	----------	0	0	----------
Des Moines	0	1	0	----------	----------	0	0	----------
Sioux City	1	0	1	----------	----------	0	0	----------
Waterloo	0	0	0	----------	----------	0	0	----------
Missouri:								
Kansas City	0	1	1	----------	0	4	2	3
St. Joseph	0	0	0	----------	0	0	0	2
St. Louis	2	13	7	----------	----------	0	1	4
North Dakota:								
Fargo	0	1	0	----------	0	0	0	0
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Aberdeen	3	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	0	2	2	----------	0	2	1	2
Kansas:								
Topeka	0	0	0	----------	0	0	5	0
Wichita	3	0	0	----------	0	0	1	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	0	0	----------	0	0	4	2
Maryland:								
Baltimore	4	11	5	1	1	2	2	10
Cumberland	0	0	0	----------	0	0	0	1
Frederick	0	0	0	----------	0	0	0	0

City reports for week ended August 22, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—continued								
District of Columbia:								
Washington	6	6	1	1	1	1	0	3
Virginia:								
Lynchburg	0	1	0		0	0	1	0
Norfolk	0	1	0		0	0	0	2
Richmond	0	5	0		0	0	0	2
Roanoke	0	1	0		0	2	0	2
West Virginia:								0
Charleston	0	0	0		0	0	0	0
Wheeling	0	0	0		0	0	0	2
North Carolina:								
Raleigh	0	0	0		0	0	0	0
Wilmington	0	0	1		0	0	0	0
Winston-Salem	0	1	1		0	4	5	1
South Carolina:								
Charleston	0	0	0	5	0	1	0	0
Columbia	0	1	1		0	0	0	2
Greenville	0	0	0		0	0	0	0
Georgia:								
Atlanta	0	2	3	1	1	0	0	6
Brunswick	0	0	0		0	0	0	1
Savannah	0	0	0	1	0	0	0	2
Florida:								
Miami	0	1	1		0	0	1	0
Tampa	0	0	0		0	0	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	0	0	0
Tennessee:								
Memphis	1	1	1		0	1	0	3
Nashville	0	1	1		0	2	0	2
Alabama:								
Birmingham	0	2	3	1	0	1	0	2
Mobile	0	0	0		0	0	0	2
Montgomery	0	0	1	1		0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	2			0	0	
Little Rock	0	0	0		0	0	0	2
Louisiana:								
New Orleans	0	5	12		0	0	0	5
Shreveport	1	0	0		0	0	0	0
Oklahoma:								
Muskogee	0	0	3		0	0	0	0
Oklahoma City	1	0	3	3	0	0	0	0
Tulsa	0	1	0			0	0	
Texas:								
Dallas	0	4	2		0	1	0	1
Fort Worth	0	0	2		0	0	0	0
Galveston	0	0	0		0	0	0	0
Houston	0	0	1		0	1	0	7
San Antonio	0	2	3		0	0	0	2
MOUNTAIN								
Montana:								
Billings	0	0	0		0	5	0	0
Great Falls	1	0	0		0	1	0	0
Helena	0	0	0		0	0	0	0
Missoula	0	0	0		0	1	0	0
Idaho:								
Boise	0	1	0		0	1	0	1
Colorado:								
Denver	5	6	5		0	0	0	4
Pueblo	1	1	0		0	0	0	0
New Mexico:								
Albuquerque	0	0	0		0	0	0	1
Utah:								
Salt Lake City	4	1	0		0	0	1	0
Nevada:								
Reno	0	0	0		0	0	0	0

City reports for week ended August 22, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
PACIFIC								
Washington:								
Seattle	2	2	1	1	----------	1	2	----------
Spokane	0	1	0	3	----------	0	0	----------
Tacoma	0	1	0	----------	0	0	2	0
Oregon:								
Portland	4	3	2	----------	0	0	0	1
Salem	0	0	0	1	0	0	1	0
California:								
Los Angeles	3	19	12	4	3	8	6	15
Sacramento	0	0	0	----------	0	0	0	3
San Francisco	2	6	5	1	0	2	2	4

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	0	0	0	0	0	0	1	1	0	8	16
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	5
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	2	4
Burlington	1	0	0	0	0	0	0	0	0	0	10
Massachusetts:											
Boston	15	21	0	0	0	7	3	0	0	34	178
Fall River	0	2	0	0	0	1	1	0	0	2	21
Springfield	1	1	0	0	0	1	0	1	1	2	20
Worcester	2	6	0	0	0	5	0	0	0	12	27
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	7
Providence	2	8	0	0	0	2	1	0	0	9	50
Connecticut:											
Bridgeport	2	1	0	0	0	1	0	0	0	0	18
Hartford	1	2	0	0	0	5	1	0	0	5	45
New Haven	1	0	0	0	0	1	1	0	0	0	36
MIDDLE ATLANTIC											
New York:											
Buffalo	5	4	0	0	0	7	1	1	1	11	129
New York	23	33	0	0	0	103	34	19	3	167	1,310
Rochester	2	7	0	0	0	0	0	1	0	4	68
Syracuse	1	8	0	0	0	2	0	0	0	14	45
New Jersey:											
Camden	0	0	0	0	0	2	0	1	0	3	29
Newark	3	1	0	0	0	6	2	1	0	136	78
Trenton	1	0	0	0	0	2	0	0	0	0	34
Pennsylvania:											
Philadelphia	14	21	0	0	0	32	8	4	0	106	388
Pittsburgh	7	9	0	0	0	6	2	3	1	49	138
Reading	0	0	0	0	0	0	0	1	0	2	19
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	16	0	0	0	9	2	0	0	10	111
Cleveland	9	14	0	0	0	17	3	0	0	78	172
Columbus	2	1	0	0	0	5	0	2	0	1	68
Toledo	2	3	1	0	0	4	2	0	0	21	57
Indiana:											
Fort Wayne	0	1	0	0	0	3	0	0	0	1	17
Indianapolis	2	1	0	0	0	2	1	2	1	20	--------
South Bend	1	0	0	0	0	0	0	0	0	1	13
Terre Haute	0	--------	0	--------	--------	--------	0	--------	--------	--------	--------

City reports for week ended August 22, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
EAST NORTH CENTRAL—con.											
Illinois:											
Chicago	24	24	1	0	0	36	5	6	0	152	553
Springfield	0	0	0	0	0	0	1	2	0	0	17
Michigan:											
Detroit	21	20	1	0	0	21	4	6	0	158	239
Flint	3	1	0	0	0	2	0	0	0	0	19
Grand Rapids	3	6	0	0	0	0	0	0	0	3	23
Wisconsin:											
Kenosha	0	2	0	0	0	0	0	0	0	1	6
Madison	1	0	0	0	------	------	0	1	------	2	------
Milwaukee	4	6	0	0	0	5	1	0	0	57	81
Racine	1	1	0	0	0	0	0	0	0	12	13
Superior	1	0	0	0	0	0	0	0	0	0	5
WEST NORTH CENTRAL											
Minnesota:											
Duluth	3	1	0	0	0	0	1	0	0	1	15
Minneapolis	10	7	1	2	0	3	1	2	0	6	80
St. Paul	6	------	0	------	------	------	1	------	------	------	------
Iowa:											
Davenport	0	0	1	0	------	------	0	0	------	0	------
Des Moines	2	2	1	1	------	------	0	0	------	0	19
Sioux City	0	0	0	0	------	------	0	1	------	5	------
Waterloo	0	0	0	0	------	------	0	1	------	0	------
Missouri:											
Kansas City	2	1	0	0	0	5	2	1	1	3	64
St. Joseph	0	0	0	0	0	0	1	0	0	4	22
St. Louis	8	1	1	0	0	15	7	4	0	37	194
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	9	7
Grand Forks	1	0	0	0	------	------	0	0	------	0	------
South Dakota:											
Aberdeen	0	0	0	0	------	------	0	0	------	1	------
Nebraska:											
Omaha	1	0	1	1	0	3	1	1	0	1	36
Kansas:											
Topeka	1	0	0	0	0	1	0	0	0	2	13
Wichita	1	0	0	0	0	1	1	0	0	0	16
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	0	0	0	0	1	0	0	0	3	27
Maryland:											
Baltimore	4	4	0	0	0	12	8	7	0	84	13
Cumberland	0	0	0	0	0	0	1	2	0	0	16
Frederick	0	1	0	0	0	0	0	0	0	0	5
District of Columbia:											
Washington	4	6	0	0	0	11	4	2	0	10	128
Virginia:											
Lynchburg	0	0	0	0	0	0	1	5	2	0	8
Norfolk	1	3	1	0	0	3	1	1	0	1	------
Richmond	2	4	0	0	0	3	2	2	0	0	36
Roanoke	0	0	0	0	0	1	1	0	0	0	15
West Virginia:											
Charleston	0	0	0	0	0	0	1	1	0	0	5
Wheeling	0	0	0	0	0	0	0	1	0	0	15
North Carolina:											
Raleigh	0	0	0	0	0	0	0	0	0	1	22
Wilmington	0	0	0	0	0	0	1	0	0	5	------
Winston-Salem	1	0	0	0	0	0	2	0	1	19	12
South Carolina:											
Charleston	0	0	0	0	0	1	2	3	0	0	20
Columbia	0	0	0	0	0	0	1	1	0	0	21
Greenville	0	0	0	0	0	0	0	0	0	0	------
Georgia:											
Atlanta	3	3	1	2	0	8	4	1	0	2	90
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	0	0	0	0	4	0	2	0	0	29

City reports for week ended August 22, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
Florida:											
Miami	0	0	0	0	0	2	0	0	0	0	315
Tampa	0	0	0	0	0	1	0	1	0	0	1
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	1	0	0	2	0	0	0	0	18
Tennessee:											
Memphis	1	1	1	0	0	5	10	1	1	26	78
Nashville	0	0	0	0	0	2	6	2	0	3	40
Alabama:											
Birmingham	2	2	0	0	0	5	5	4	2	6	61
Mobile	0	0	0	0	0	2	0	0	0	0	24
Montgomery	1	0	0	0	--------	--------	1	5	--------	0	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	--------	--------	0	0	--------	0	--------
Little Rock	0	0	0	0	0	4	2	0	0	0	8
Louisiana:											
New Orleans	2	5	0	0	0	24	4	19	[1]3	2	135
Shreveport	0	0	0	0	0	1	2	0	2	3	39
Oklahoma:											
Muskogee	0	0	0	0	0	0	0	1	0	0	--------
Oklahoma City	1	3	0	0	0	0	3	1	0	0	25
Tulsa	0	1	0	0	--------	--------	2	2	--------	0	--------
Texas:											
Dallas	3	2	1	0	0	2	3	4	2	11	50
Fort Worth	1	4	0	0	0	0	1	0	0	0	24
Galveston	0	0	0	0	0	0	0	0	0	0	7
Houston	1	0	0	0	0	3	1	2	0	3	73
San Antonio	0	1	0	0	0	6	1	2	2	0	48
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	3
Great Falls	0	0	0	0	0	1	0	0	0	0	8
Helena	0	0	0	0	0	0	0	0	0	0	5
Missoula	0	0	0	0	0	0	0	0	0	0	10
Idaho:											
Boise	0	2	0	0	0	1	0	0	0	0	9
Colorado:											
Denver	3	3	0	0	0	6	1	0	1	13	63
Pueblo	0	0	0	0	0	0	1	0	0	0	--------
New Mexico:											
Albuquerque	0	0	0	0	0	3	0	0	0	2	10
Utah:											
Salt Lake City	1	0	0	0	0	1	2	1	1	2	32
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	7
PACIFIC											
Washington:											
Seattle	2	5	0	1	--------	--------	1	1	--------	11	--------
Spokane	1	0	0	0	--------	--------	1	0	--------	0	--------
Tacoma	1	3	1	1	0	0	0	1	1	3	9
Oregon:											
Portland	2	3	3	5	0	2	1	2	0	0	47
Salem	0	1	0	0	0	0	0	0	0	0	--------
California:											
Los Angeles	8	5	1	0	0	20	3	0	0	9	240
Sacramento	1	0	0	0	0	2	0	1	1	1	21
San Francisco	5	3	1	0	0	12	2	1	0	22	153

[1] Out of town.

City reports for week ended August 22, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	1	3	0
Massachusetts:									
Boston	1	1	1	0	0	0	2	36	4
Fall River	0	0	0	0	0	0	1	2	0
Springfield	0	0	0	0	0	0	0	5	1
Rhode Island:									
Pawtucket	0	0	0	0	0	0	0	1	0
Providence	0	0	0	0	0	0	0	19	2
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	7	0
Hartford	0	0	0	0	0	0	0	30	2
New Haven	0	0	0	0	0	0	0	10	0
MIDDLE ATLANTIC									
New York:									
Buffalo	1	1	0	0	0	0	1	4	0
New York	5	2	1	0	0	0	9	422	46
Rochester	0	0	0	0	0	0	0	2	0
Syracuse	0	0	0	0	0	0	3	1	0
New Jersey:									
Newark	1	0	0	0	0	0	1	7	0
Pennsylvania:									
Philadelphia	5	2	0	0	0	0	1	0	0
Pittsburgh	1	0	1	0	0	0	1	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	1	0	0	0	0	1	0	0
Cleveland	1	1	11	0	0	0	1	7	1
Indiana:									
Indianapolis	2	2	0	0	0	0	0	0	0
South Bend	0	0	0	0	0	0	0	3	0
Illinois:									
Chicago	5	1	0	0	1	2	2	10	2
Springfield	0	0	0	0	0	0	0	1	0
Michigan:									
Detroit	1	0	1	0	0	0	1	12	0
Flint	0	1	0	0	0	0	0	1	0
Grand Rapids	0	0	0	0	0	0	0	2	0
Wisconsin:									
Madison	0	0	0	0	0	0	0	3	0
Milwaukee	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	11	2
Minneapolis	0	0	0	0	0	0	0	2	0
Missouri:									
St. Louis	2	2	0	0	0	0	0	2	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	0	0	0	0	2	0
District of Columbia:									
Washington	0	0	0	0	1	3	0	0	0
Virginia:									
Richmond	0	0	0	0	0	0	1	1	0
West Virginia:									
Charleston	0	0	0	0	0	0	0	1	0
Wheeling	0	0	0	0	0	0	0	2	0
South Carolina:									
Charleston	0	0	0	0	4	0	0	0	0
Georgia: [1]									
Atlanta	1	1	0	0	0	0	0	0	0

[1] Typhus fever: 1 case at Savannah, Ga.

City reports for week ended August 22, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	1	0	1	0	1	1	0	0
Nashville	0	1	0	0	0	0	0	0	0
Alabama									
Mobile	0	0	0	0	0	1	0	0	0
Montgomery	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas									
For Smith	1	0	0	0	0	0	0	0	0
Little Rock	0	1	0	0	0	1	0	0	0
Louisiana.									
New Orleans	1	0	0	0	0	0	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
MOUNTAIN									
New Mexico:									
Albuquerque	0	0	0	0	0	0	0	1	0
PACIFIC									
Washington:									
Seattle	2	0	0	0	0	0	1	2	0
California:									
Sacramento	1	1	0	0	0	0	0	0	0
San Francisco	0	0	0	0	2	0	0	0	0

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended August 22, 1931, compared with those for a like period ended August 23, 1930. The population figures used in computing the rates are estimated midyear populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, July 19 to Aug. 22, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug. 22, 1931	Aug. 23, 1930
98 cities	33	37	35	38	31	37	[2] 33	31	[3] 30	33
New England	50	24	53	36	65	34	41	44	67	44
Middle Atlantic	34	33	31	34	26	32	26	22	19	27
East North Central	39	49	38	48	31	48	[4] 30	36	[5] 28	40
West North Central	33	35	17	35	29	29	36	27	[6] 32	25
South Atlantic	28	38	32	40	26	18	[7] 44	38	24	40
East South Central	12	24	12	6	41	18	[8] 19	30	35	12
West South Central	24	31	61	35	64	49	[9] 48	49	68	63
Mountain	35	70	35	35	26	18	78	18	44	44
Pacific	16	28	47	45	18	57	[10] 39	30	35	22

See footnotes at end of table.

Summary of weekly reports from cities, July 19 to Aug. 22, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930.[1]—Continued.

MEASLES CASE RATES

	Week ended—									
	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug. 22, 1931	Aug. 23, 1930
98 cities	133	105	93	67	60	49	[2] 39	32	[3] 29	28
New England	209	191	132	106	135	99	79	65	63	65
Middle Atlantic	111	144	84	87	57	61	32	39	25	31
East North Central	214	59	153	33	87	27	[4] 62	19	[5] 37	21
West North Central	34	64	27	43	15	52	11	31	[6] 15	19
South Atlantic	83	50	47	60	34	24	[7] 10	24	20	20
East South Central	105	54	47	33	12	18	[8] 25	18	23	6
West South Central	14	7	10	10	3	10	[9] 0	7	7	0
Mountain	174	176	209	159	70	115	61	44	70	26
Pacific	125	164	57	105	43	63	[10] 52	43	22	40

SCARLET FEVER CASE RATES

98 cities	53	49	47	38	46	31	[2] 34	30	[3] 44	32
New England	111	73	82	60	43	46	53	56	99	51
Middle Atlantic	56	34	52	21	51	20	31	17	38	25
East North Central	69	76	52	50	60	45	[4] 48	39	[5] 57	35
West North Central	29	31	31	48	19	27	23	29	[6] 21	35
South Atlantic	38	40	41	44	38	20	[7] 22	28	36	30
East South Central	6	48	35	6	41	12	[8] 44	48	17	30
West South Central	44	45	20	52	41	35	[9] 17	31	27	35
Mountain	0	26	61	62	61	70	26	44	44	88
Pacific	12	38	16	34	22	38	[10] 13	32	31	28

SMALLPOX CASE RATES

98 cities	3	7	2	4	3	3	[2] 1	3	[3] 1	2
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	2	8	1	2	2	6	[4] 8	3	[5] 0	0
West North Central	10	21	11	12	13	6	8	6	[6] 6	8
South Atlantic	0	2	2	4	2	2	[7] 2	0	4	2
East South Central	6	18	6	0	0	0	[8] 0	6	0	0
West South Central	0	3	3	14	0	7	[9] 0	3	0	7
Mountain	0	18	0	0	9	0	9	0	0	0
Pacific	20	22	8	22	14	4	[10] 3	12	4	10

TYPHOID FEVER CASE RATES

93 cities	16	18	27	18	22	17	[2] 22	20	[3] 21	19
New England	10	7	12	7	14	5	26	5	5	17
Middle Atlantic	8	7	13	5	16	10	14	14	14	13
East North Central	5	13	11	12	10	11	[4] 7	10	[5] 11	9
West North Central	19	48	31	23	19	19	13	29	[6] 21	21
South Atlantic	69	42	77	52	53	66	[7] 78	44	55	60
East South Central	47	66	64	108	29	60	[8] 75	132	70	73
West South Central	10	38	109	42	95	14	[9] 45	42	91	24
Mountain	0	18	17	26	44	35	44	26	9	26
Pacific	27	10	4	16	14	10	[10] 10	12	8	6

See footnotes at end of table.

Summary of weekly reports from cities, July 19 to Aug. 22, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930.[1]—Continued.

INFLUENZA DEATH RATES

	Week ended—									
	July 25, 1931	July 26, 1930	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug. 22, 1931	Aug. 23, 1930
91 cities	1	2	3	1	2	3	[11] 3	1	[3] 2	3
New England	0	0	2	0	2	0	0	0	2	0
Middle Atlantic	1	1	4	0	3	2	3	2	2	3
East North Central	2	3	2	1	1	1	[4] 2	0	[5] 2	1
West North Central	0	3	0	0	0	3	3	3	[6] 3	0
South Atlantic	2	4	6	6	0	10	[7] 4	0	6	8
East South Central	0	0	13	0	13	0	[8] 7	0	0	0
West South Central	3	11	0	0	3	0	7	0	0	4
Mountain	0	0	0	0	0	18	17	0	0	9
Pacific	2	2	7	2	5	5	[10] 3	0	7	7

PNEUMONIA DEATH RATES

91 cities	44	56	48	52	48	52	[11] 46	53	[3] 48	45
New England	31	44	41	41	34	46	29	41	36	56
Middle Atlantic	55	68	59	59	52	56	56	68	56	53
East North Central	32	38	30	43	35	47	[4] 37	27	[5] 32	27
West North Central	53	57	47	48	56	45	44	27	[6] 38	36
South Atlantic	43	86	65	66	79	72	[7] 56	74	63	52
East South Central	44	91	50	52	63	45	[8] 55	52	57	65
West South Central	52	71	59	75	62	53	52	85	59	57
Mountain	17	79	44	62	44	70	44	123	44	53
Pacific	43	7	36	35	38	35	[10] 17	40	53	40

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] South Bend and Terre Haute, Ind., Raleigh, N. C., Covington, Ky., Fort Smith, Ark., and San Francisco, Calif., not included.
[3] Terre Haute, Ind., and St. Paul, Minn., not included.
[4] South Bend and Terre Haute, Ind., not included.
[5] Terre Haute, Ind., not included.
[6] St. Paul, Minn., not included.
[7] Raleigh, N. C., not included.
[8] Covington, Ky., not included.
[9] Fort Smith, Ark., not included.
[10] San Francisco, Calif., not included.
[11] South Bend and Terre Haute, Ind., Raleigh, N. C., Covington, Ky., and San Francisco, Calif., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended August 15, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended August 15, 1931, as follows:

	Dysentery	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia					1
New Brunswick					1
Quebec [1]					
Ontario		2	9	2	35
Manitoba					3
Saskatchewan	3		1	6	1
Alberta [1]					
British Columbia			5	3	2
Total	3	2	15	11	43

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended August 15, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 15, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	12	Poliomyelitis	17
Diphtheria	10	Scarlet fever	22
Erysipelas	3	Tuberculosis	49
Measles	7	Typhoid fever	28
Ophthalmia neonatorum	1	Whooping cough	34

CUBA

Habana—Communicable diseases—Four weeks ended July 18, 1931.—During the four weeks ended July 18, 1931, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	3		Scarlet fever	2	
Diphtheria	7	5	Tuberculosis	22	3
Malaria [1]	7		Typhoid fever [1]	29	9
Measles	57	4			

[1] Many of these cases are from the island of Cuba, outside of Habana.

JAMAICA

Communicable diseases—Four weeks ended July 18, 1931.—During the four weeks ended July 18, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox		7	Puerperal fever		8
Diphtheria	1	1	Scarlet fever	3	16
Dysentery	1	5	Tuberculosis	36	74
Erysipelas		3	Typhoid fever	11	82
Leprosy	1	1			

MEXICO

Tampico—Communicable diseases—July, 1931.—During the month of July, 1931, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	2		Measles	11	3
Dysentery	12	4	Paratyphoid fever	1	1
Enteritis (various)		69	Tuberculosis	39	33
Influenza	9	3	Typhoid fever	8	6
Malaria	171	22	Whooping cough	39	

PORTO RICO

San Juan—Communicable diseases—Four weeks ended July 18, 1931.—During the four weeks ended July 18, 1931, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	6	Tetanus	4
Malaria	49	Whooping cough	10
Ophthalmia neonatorum	1		

TRINIDAD

Port of Spain—Vital statistics—June, 1930, 1931.—The following statistics for the month of June, 1930 and 1931, are taken from a report issued by the public health department of Port of Spain, Trinidad:

	June, 1930	June, 1931		June, 1930	June, 1931
Number of births	150	160	Deaths under 1 year	18	20
Birth rate per 1,000 population	27.1	28.3	Deaths under 1 year per 1,000 births	120	125
Number of deaths	110	93			
Death rate per 1,000 population	19.9	16.5			

YUGOSLAVIA

Communicable diseases—June, 1931.—During the month of June, 1931, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	52	6	Paratyphoid fever	5	
Cerebrospinal meningitis	19	9	Puerperal fever	3	3
Diphtheria and croup	439	55	Rabies	1	1
Dysentery	93	13	Scarlet fever	442	34
Erysipelas	153	6	Tetanus	45	26
Lethargic encephalitis	3	3	Typhoid fever	148	19
Measles	1,004	9	Typhus fever	3	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	June, 1931: 13	June, 1931: 20	June, 1931: 27	July, 1931: 4	July, 1931: 11	July, 1931: 18	July, 1931: 25	August, 1931: 1	August, 1931: 8	August, 1931: 15	August, 1931: 22	August, 1931: 29
Ceylon: Colombo	C		1		1	1								1	1	1		
	D				1	1								1	1	1		
China:																		
Canton	C			1	2			1										
	D				1													
Shanghai	C										1				1	5		
Swatow	C						3	1	6	7								
Tientsin	C				1		2	8										
	D				1			1										
India	C	11,544	8,968	11,462	13,604	3,932	4,657	4,687	4,725	4,737	5,002							
	D	6,131	4,550	5,767	7,270	2,146	2,656	2,704	2,831	2,677	2,848							
Bombay	C			2							1	11	11	9	13	6		
	D			1								6	10	4	9	7		
Calcutta	C	170	436	310	265	94	74	50	74	72	62	55	48	42	27	20		
	D	112	256	176	149	57	47	26	38	35	34	58	28	10	7	7		
Karikal	C	9	12	19	12													
	D	8	12	14	7													
Madras	C	72	20	26	52	3	6			2	2			1		2		
	D	29	10	13	17		4											
Moulmein	C											1						
	D											1						
Negapatam	D	3																
Rangoon	C				2		2		2		1	2	1		1	1		
	D				1		1		1			1			1	1		
Tuticorin	C	1																
Vizagapatam	C								1									
India (French):																		
Chandernagor	C	5	7	6	4		1	2		1	1	1	2	1	4	2		
	D	5	6	5	4		1	2			1			1	4	2		
Pondicherry	C	100	100	24	17	1	1	1			1	1	1	1		1		
	D	34	18	4	7	1	1	1			1	1	1	1		1		
India (Portuguese)	C								1		2							
	D										1							

Indo-China (see also table below):																		
Cochin-China—Rachgia	C													P				
Pnompenh	C	9		2		1					1	4			1			
	D	5	1	1	2	1					1	1			1			
Saigon and Cholon	C	4	5	27	104	18	16	14	13	8	3	3						
	D	4	5	22	76	9	14	9	9	3	2	2						
Iraq:																		
Abulkhasib	C																6	
	D																5	
Amara	C																2	22
	D																1	21
Amara Province	C																	6
	D																	5
Basra	C													3	9	263	272	148
	D													2	8	140	137	76
Basra Province	C																5	14
	D																2	10
Muntafiq Province	C																	10
	D																	8
Suqelshuyukh	C																	2
	D																	2
Persia: Rafsanjan [1]	C				36													
	D				14													
Philippine Islands: [2] Provinces—																		
Capiz	C	186	48	29	17	4												
	D	146	41	24	15	4												
Cebu	C														1	1	1	
	D														1	1	1	
Iloilo	C	95	7			8	7	5	6	24	3							
	D	65	4			6	5	6	4	22	3							
Masbate	C		21															
	D		9															
Negros, Occidental	C	4							2									
	D	4							1									
Pampanga	C				1													
Siam	C	1	10	16	14		1	3		1	1			1				
	D		2	4	5		1	1			1							
Ayudhaya District	C		1															
Bangkok	C	2	3	3	3				1	1			3					
	D	1	2	2	1				1				2					
Bismulok Province	C		8															
	D		2															
On vessel:																		
S. S. Arankola at Rangoon from Calcutta	C				1													
S. S. City of Eastborne, at Calcutta from Cocanada	C					1												
S. S. Tairea, at Penang from Calcutta	C						1											
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C												1					
	D												1					
S. S. Kohistan, at Basra from Bushire, Persia	C												2					

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		January, 1931	February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			Aug. 1-10, 1931
						1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	
Indo-China (French) (see also table above):															
Cambodia [1]	C	62	125	79	58		44	40	83	96		72	82	87	12
Cochin-China [1]	C	24	29	105	62	1	52	75	71	69		66	30	47	39

PLAGUE

Place		Feb. 8-Mar. 7, 1931	Mar. 8-Apr. 4, 1931	Apr. 5-May 2, 1931	Week ended— May, 1931				June, 1931				July, 1931				August, 1931			
					9	16	23	30	6	13	20	27	4	11	18	25	1	8	15	22
Algeria:																				
Algiers	C	1	1													2				
	D		1																	
Bone	C								1											
Constantine, vicinity of	C	1																		
Philippeville	C																	1		
	D																	1		
Argentina:																				
Cordoba Province	C	2																		
Entre Rios Province—Diamante	C	2																		
Jujuy Province—Palpala	C	1																		
San Juan Province	C													P	P					
Santa Fe	C	2																		
Belgian Congo	C		2							1										
	D		2							1										
British East Africa (see also table below):																				
Tanganyika	C	22	8	18	17	5	7	17	4	7	5	1								
	D	4	1	21	11	2	8	9	2	4	1	3								
Uganda	C	15	19	35	11	33	31	63		91	106	101	95	132						
	D	15	19	32	11	26	28	61		87	100	99	94	129						

Ceylon: Colombo	C	11	8	4	1	1		1		1		1				1	4	1	1	
	D	13	7	3	1	1		1		1		1				1	4	1	1	
Plague-infected rats		3	4	1			5										1	3	4	
China: Amoy [2]	C				1															
	D				1															
Dutch East Indies:																				
Batavia and West Java	C	141	84	74	18	12	14	15	15	25	11	15	21	18	19					
	D	128	80	71	18	12	14	15	15	25	11	15	21	18	19					
East Java and Madura	C	1	4	1	1															
	D	1	4	1	1															
Java and Madura	D	376	277	243	47	41	46	42	41	58	48	45	59	55	52					
Egypt:																				
Alexandria	C	2	1								3	1	1	1	2	9	4	3	1	
	D										3	1	1			4	1	2		
Plague-infected rats		1																		
Assiout	C	41	13	32	4	5	8	1	4		5	2								
	D	11	6	17	2	4	1					1								
Beni-Suef	C			12	3		2													
	D			3	1		2													
Beheira	C																1		1	
Cairo	C		1																	
Dakahlia	C														1			2		
Deirout	C	16		3	7	1		2	3											
	D	4		1	2	2			1											
Gharbieh	C									1										
	D									1										
Girga	C		86	44	1	1		5					1							
	D		24	22	1	1														
Kena	C		5	3			1													
	D		2	1			1													
Manfalut	C	15	17																	
	D	5	3																	
Minieh	C		3	1	5		1		3				10		2					
	D		2		2		1		1				2		1	1				
Port Said	C									1	1	1	1	1	2	1	2			
	D						1				1	1	1							
Tanta	C																		2	
Hawaii Territory:																				
Hawaii—Hamakua—Plague-infected rats							1													
Maui Island—Kula District	C																	1		
	D																	1		
India	C	5,457	9,139	6,142	434	139	130	49	39	24	9	16	30	29						
	D	3,661	7,037	5,199	385	143	131	33	25	14	2	10	15	13						
Bassein	C	1		1			1						1			3		1		
	D	1		1			1						1			2		1		
Bombay	C	1	4	11	5	1	1	1					1							
	D	1	3	11	4	1	1													
Plague-infected rats		32	70	137	26	30	17	21	10	10	10	7	11	16	9	12	8	13	17	
Burma	C														7	9				
	D														5	5				

[1] Reports incomplete.
[2] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15	22
India—Continued.																				
Calcutta	C			2																
	D			2																
Madras Presidency	C	74	23	3	1	1				1	5		1	2						
	D	40	21	2		1				1				1						
Rangoon	C		1	1	1			1		1					2		1			
	D		1	1	1			1		1					1		1			
Plague-infected rats		8	7	4	1	1	3	2		3			1	2	2	1	1		1	
Indo-China (see also table below): Pnompenh	C	1							1		1									
	D	4	6	4					1		1									
Iraq:																				
Baghdad	C	3	8	23	7	10	4	2	10	6	1	6	1	1	1				1	
	D	2	5	8	3	4	2		1	4	1	3	1		1					
Maudhan	C							2												
Madagascar (see also table below): Tamatave	C																1			
Nigeria: Lagos	C			5																
	D			5																
Plague-infected rats				6																
Peru (see table below).																				
Senegal (see table below).																				
Siam	C	18	31	1	1			1	1											
	D	14	7	1	1			1	1											
Bangkok	C	6	29																	
	D	5	6																	
Nagara Rajsima	C	7	1																	
	D	6																		
Spain: Hospitalet—Barcelona Province	C																			5
	D																			2
Syria: Beirut	C	1												1		1				
Tripolitania	C	1																		
Tunisia: Tunis	C	14	10	16	7		8	1		8	2	1								
	D	7	4	8	3					1										
Union of South Africa:																				
Cape Province	C			3																
Orange Free State	C	1	6	2			1	1												
	D	1	1	2				2												

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
British East Africa (see also table above):							
Kenya	C	21	7	345	245	154	441
Indo-China (see also table above)	C		4	11		2	1
	D	2		2		2	1
Madagascar (see also table above):							
Ambositra Province	C	92	70	30	19	15	
	D	88	66	29	18	15	
Antisirabe Province	C	84	83	48	7	8	
	D	79	74	47	7	8	
Miarinarivo Province	C	31	19	6	2		
	D	29	19	6	2		
Moramanga Province	C	7	1		2		
	D	7	1		2		
Tananarive Province	C	145	90	41	18	2	
	D	139	81	40	18	1	

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Peru	C	12	8	8	2	5	2
	D	6	2	1		1	
Senegal:							
Baol [1]	C				4		27
	D				3		13
Dakar [1]	C			2	63	64	95
	D			1	49	56	73
Louga [1]	C		14	1	5	4	3
	D		6		2	2	1
Rufisque [1]	C	2			1	2	34
Thies [1]	C					12	16
	D					3	7
Tivaouane [1]	C			4	19	3	3
	D				11	2	2

SMALLPOX

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931				June, 1931				July, 1931				August, 1931		
					9	16	23	30	6	13	20	27	4	11	18	25	1	8	15
Algeria:																			
Algiers	C	1	2	2			1			7	1				1				
Constantine	C		1		1								1						
Arabia: Aden	C	1																	
Belgian Congo	C					7	10	30	27	15									
Belgium	C	1																	
Bolivia.[2]																			
Brazil: Porto Alegre (alastrim)	C	7	49	53	2	4	7	6	2	3			9	10	9	13			
	D	1	1						1					1					
British East Africa: Tanganyika	C	91	8			13					1	6	37	83					
	D	13	3										7	5					
British South Africa:																			
Northern Rhodesia	C													21					
Southern Rhodesia	C									1				2					

[1] Reports incomplete.
[2] An epidemic of smallpox was reported on May 13 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	May 16	May 23	May 30	June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11	July 18	July 25	August, 1931: 1	Aug. 8	Aug. 15
Canada:																			
Alberta	C	1												1					
British Columbia	C	8													2	2			3
Manitoba	C	1			4														
Winnipeg	C	1																	
Nova Scotia	C		1																
Ontario	C	29	9	17	17	5		3		4	3	14	3	6	12	1		2	2
Kingston	C	1		5															
North Bay	C	1																	
Ottawa	C	1									1								
Sault Ste. Marie	C	2		4		1													
Toronto	C		2	4	1						1								
Quebec	C												1						
Saskatchewan	C	63	58	46	7	15	18	8	7	16	18	13		13	10	19		10	6
Regina	C	1	2	2	2														
Canary Islands: Las Palmas	C		1																
Chile:																			
Antofagasta	C												1						
Chanaral	C							1											
China:																			
Amoy	C		1	2	2	1	1	2	1	2		1	1	1			1		
	D		1	1	1		1	1	1	1		1	1	1			1		
Canton	C	3	7	4			1	2			1		1			1			
Foochow	C	P	P	P				P		P						P			
Hankow	C	8	3	3	1	1	1	2	1	1	1	1	1						
Hong Kong	C	9	2	3				1											
	D	3	2	1	1			1											
Manchuria—																			
Harbin (see also table below)	C	4	2		1	1		1											
Kwantung—Dairen	C		2	2	1			1	1										
Nanking	C	P	P	P	P	P	P												
Shanghai—																			
Foreigners only	C	16	6	17	1	4	1	1	2	6	2	1	2	1					
Including natives	D	14	10	18	1		3	3	1	5	4	3	2	1	2	1			
Swatow	D	13	26	2															
Tientsin	C				2									2	1				

Chosen (see table below).																			
Colombia: Cali	D																		
Dutch East Indies:																			
Batavia and West Java	C	2	1			1	1												
	D	1																	
East Java and Madura	C							1											
Finland	C			1															
France (see table below).																			
Great Britain:																			
England and Wales	C	745	795	744	186	166	111	107	83	94	62	48	56	45	50	36	26	25	19
Bradford	C	1	2	6	1	3	1	3			5								
Leeds	C		1	2	1		1												
London	C	98	147	227	66	44	37	36	25	50	31	16	21	9	12	12	6	12	4
London and Great Towns	C	683	544	558	139	108	84	72	57	84	49	38	53	33	34	32	22	20	17
	D	1		2					1				1						
Sheffield	C	32	10	7															
Stoke-on-Trent	C	1																	
Greece (see table below).																			
Honduras:																			
Amapala	C	1																	
Ocotopeque and Gracias districts	C	P																	
Puerto Castilla	C	3																	
Tegucigalpa	C			1															
Tela	C			1															
India	C	12,222	11,791	14,265	3,422	2,836	2,477	2,668	2,170	1,856	1,622	1,665	1,492	1,370					
	D	2,660	2,261	2,923	709	572	538	530	465	474	376	389	404	363					
Bassein	C							1											
Bombay	C	6	10	8	2		6	1		2	1	3		1	3	2	1		1
	D	3	4	5	1	1	1	1		1	1	3		1	3	2	1		
Calcutta	C	251	382	287	24	30	19	16	14	19	14		11	6	2	2	4	4	
	D	188	203	224	18	25	17	15	12	18	11		9	4	3	2		4	
Cochin	C	59	46	39	3													1	1
	D	3																	
Karachi	C	4	4	6							2						1		
	D		2								1								
Madras	C	8	22	19	1	3	3	1			1	1		2			1		
	D	1	3	5		1	5					1							
Negapatam	C			3							2	1							
Rangoon	C	4	3	11	7	5		1		1	4	1	2		1		2		1
	D		1	1	2	1	1	1		1		1	1				1		
Vizagapatam	C	8	2	10			5	1	2	1		3	2		2	1		3	
	D	2	1	2			1			1		1	1					3	
India (French):																			
Chandernagor	C	12	14	10	3		4				1		2		1				
	D	1	2	7	3		2						2						
Karikal	C	19	3	4	1	1	1	1	1	2		3	1	1	1	1	1		1
	D	18		3	1	1	1	1	1	2		3	1	1	1	1	1		1
Pondicherry Province	C	19	14	6	1	2	7	1	3	2	1	1	4	1		23	11		
	D	19	14	9	1	2	7	1	3	2	1	1	4	1		23	11		
India (Portuguese)	C	14	8	21			3												
	D	3	3	6			1												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15
Indo-China (see also table below):																			
Pnompenh	C		1				1		2										
	D						1												
Saigon and Cholon	C	4	8	1		1		1					1			2	1	1	
	D	1	8	1		1							1				1		
Iraq:																			
Baghdad	C	9		2			1	2		1									
	D							2											
Basra	C							2		1									
Mosul Liwa	C	5													1				
	D	1																	
Ivory Coast (see table below).																			
Japan:																			
Kobe	C	2																	
Nagoya	C														1				
Mexico (see also table below):																			
Jalisco (State)—Guadalajara	D		1	1	1		1			1			1	1		1			2
Mexico City and surrounding territory	C	23	33	43	4	10	10	21	5	4	16		12	5	4	1	8	2	
	D	8	22	14	4	3	2	2	4	3	6		4	3	1		1	1	
Monterrey	C								1										
Torreon	C			1		1					1	2							
	D			2							1	1							
Vera Cruz	C	3	2	2	1														
Morocco (see table below).																			
Nigeria: Lagos	C		2																
Poland	C	1						3	1	1		1		17		1			
Portugal: Lisbon	C	40	52	56	19	14	16	18	5	17	12	14	15	12	18		17	12	8
Rumania (see table below).																			
Siam	C	2		1			3	3			4	1		1					
	D							1				1			1				
Spain	C	P	P												7				
Straits Settlements	C	2	4	10				2										1	
	D	1	1	5				2											
Sudan (Anglo-Egyptian)	C	97	8	3		3		3		1									
	D	10	2					2											

Place																			
Sudan (French) (see table below).																			
Syria (see table below).																			
Tunisia: Tunis	C		4																
Turkey (see table below).																			
Union of Socialist Soviet Republics (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P													
Orange Free State	C	P	P	P	P	P	P	P	P	P	P	P	P	P	P				
Transvaal	C	P	P								P		P		P				
Upper Volta	C	18	3	3	1	2		85	11		1		1						
	D		1					1											
On vessel:																			
S. S. Clan Mactoggart at Suez	C	2																	
S. S. Clan Buchanan at Suez	C	2																	
S. S. Rotterdam at Naples from Venice	C		1																
S. S. Clan McTavish at Manila from Chittagong	C			1															
S. S. Clan MacBrayne at Cochin	C	1																	
S. S. Chilka at Rangoon	C	1																	
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C			1															
S. S. Talodi at Suakin	C					1													

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
China: Harbin (see also table above)	C			7		13	10
Chosen	C	1		11		1	4
	D	1		3			
France	C	4	16	15	6	54	
Greece	C		4			3	1
Mexico (see also table above)	D		3		1	1	2
Morocco	C		4	6	7	49	48
Rumania	C			1		1	

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
Turkey	C	63	37	1		9	1
	D	7	6				
Union of Socialist Soviet Republics:							
Territories in Asia	C	194	532				
Ukraine	C	44	23				
Other territories in Europe	C	896	1,577				
Railroads, etc	C	43	77				

Place		December, 1930	January, 1931	February, 1931	March, 1931	April, 1931			May, 1931			June, 1931			July, 1931		
						1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31
Indo-China (see also table above)	C	61	141	168	264	100	42			17	41	30	16	1			7
Ivory Coast	C	9															
Sudan (French)	C	139			4												
	D	20															
Syria: Beirut	C		1									1					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	Week ended— May, 1931: 9	16	23	30	June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15	22
Algeria:																				
Algiers	C	2	3	3	3		1	3	4	4		1			1					
Constantine Department	C	4	3	9	8	3	5	6	6	3	1	16	2		1		3			
Oran	C	1		1				2	2									1		
Australia, Western	C		1	1	1															
Bulgaria	C	5	9	30		5	8	3	11	10	6	3								
	D		2	3		1		3	2	1	1	2								
Chile: Valparaiso	D	1																		
China:																				
Canton	C		1																	
Manchuria—Harbin	C	5	3	8								16								
Shanghai	C														1					
Tientsin	C			2																
Chosen (see table below).																				
Czechoslovakia (see table below).																				
Egypt:																				
Alexandria	C			1					1	1		1								
Beheira Province	C			4																
	D			2																
Eritrea: Asmara	C		1																	
Great Britain: Scotland—																				
Fife County	C							1												
Greece (see table below).																				
Guatemala [1] (see table below).																				
Iraq: Baghdad	C	5	2		2															
	D	1			2															
Irish Free State:																				
Cork County—																				
Schull	C													1						
Skibbereen	C									1		1	1							
Kerry County—																				
Dingle	C					1														
Listowel	C											1								

Limerick County—																				
Limerick	C												2				1			
Michelstown	C												1							
Mayo County—																				
Belmullet	C				1															
Westport	C																			1
Union of Socialist Soviet Republics (see table below).																				
Japan	C											1								
Latvia (see table below).																				
Lithuania (see table below).																				
Mexico (see also table below):																				
Durango	D															1				
Mexico City, including municipalities in Federal District	C	35	216	170	16	27	17	15	7	12	27		28	9	7	9	7	6		
	D	16	84	56	9	7	7	10	4	4	11		4	3	2	3	5	3		
San Luis Potosi	D	5	5	3			1	1						1	3					1
Morocco	C	28	7	13		13	29			31	42	28	37	20	24	21		2		
	D	1		1		2	2			2	3	1	4	4						
Palestine	C	3	5	5	2	1	1			2	3		2				3	3		4
Panama Canal Zone—Balboa	C					1	1													
Paraguay: Asuncion	D	1	1																	
Poland	C	189	287	533	92	81	58	67		48	33	16	9	17	13	14	10	4		
	D	19	15	28	6	4	5	3		2	1	1	2	1	1	1	1			
Rumania	C	152	214	70	63	52	54		42	16	12	10	2	2	7					
	D	24	16	8	10	5	3		4	7	2		2	2	1					
Syria	C					1	3													
Tunisia:																				
Sbeitla, vicinity of	C		20	12																
	D		7																	
Sfax	C		2																	
Tunis	C	18	14	13	12	9	8			64	9		1			1				
	D				1	2				4										
Turkey (see table below).																				
Union of Socialist Soviet Republics (see table below).																				
Union of South Africa:																				
Cape Province	C	P	1	P	P	P	P	P	P	P	P		P	P	P					
Municipality of East London	C		P								1									
Natal	C	P	1	P	P		P	P	P	P	P				P					
Orange Free State	C	P	P	P		P	P	P	P	P	P		P	P	12					
Transvaal	C	P	P	P	P	P	P	P	P	P	P		P	P	P					
Yugoslavia (see table below).																				

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reported an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
Chosen: Seoul	C	46	124	3	4		6
	D	9	8		1		1
Czechoslovakia	C	60	26		5	11	2
Greece	C	10	17	8	22	6	9
	D	2	2	1	3		
Guatemala	C						33
	D						15
Latvia	C		12				
Lithuania	C	26	3	99	34	10	13
	D	3	1	3	5		2

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
Mexico (see also table above)	D	66	83				
Turkey	C	17	18	15		3	2
Union of Socialist Soviet Republics:							
Territories in Asia	C	234	260				
Ukraine	C	410	419				
Other territories in Europe	C	1,425	1,373				
Railroads, etc	C	136	158				
Yugoslavia	C	20	12	10	43	14	2
	D	2		1	5		

YELLOW FEVER

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15	22
Brazil:																	
Alagoas State	C															1	
	D															1	
Bahia State	C		1														
Ceara State	C		2	2	1	1											1
	D			2	1												1
Minas Geraes State	C		2	5	2												
	D		1	2	1												
Rio de Janeiro State	C	1	2		2												
	D	1	2														
Cambucy	C	2	1														
	D	1															
Padua	C	1															
Sergipe State	C						1										

British Cameroons: Mamfe	C				3	1		1									
	D				2												
Colombia—Magdalena Province—near Cienaga	C											4					
Gold Coast:																	
Akuse	C									2							
	D									1							
Dagomba District	C													2			
Kintampo	C											1					
	D											1					
Tamale	C										2						
	D										2						
Wale Wale	C													1			
	D													1			
Ivory Coast:																	
Bobo Dioulasso	C										1						
	D										1						
Grand Bassam	C													4			
Kong Circle	C											4					
Seguela	C																P
Nigeria: Abakaliki	C														1		
	D														1		
Senegal: Podor (Hinterland)	C																1
	D																1
Sudan (French)	C											4	P				
Upper Volta:																	
Banfora	C												2				
	D												1				
Quagadougou	C																1

X

UNITED STATES TREASURY DEPARTMENT

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SPECIAL ARTICLES

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Copper in the Oxidation of Crystalline Glutathione
Arkansas Law Regulates Sale of Anti-Freeze Mixtures

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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PUBLIC HEALTH REPORTS

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A NOTE ON THE HISTORY OF PELLAGRA IN THE UNITED STATES

By G. A. WHEELER, *Surgeon, United States Public Health Service*

In connection with the epidemiological studies (1) of pellagra in Spartanburg and neighboring counties of South Carolina, which were begun early in 1916, it very soon became apparent that the disease had been prevalent in that section for a longer period and to a greater extent than had been generally accepted. This early impression was gained largely from frequent references by pellagrins to recurrent attacks extending over a long period and by many of the older residents to conditions observed years before, many of which, from the descriptions furnished, could easily have been, and in all probability were, pellagrous in nature. Such observations prompted inquiries among some of the older local physicians, many of whom could quite distinctly recall cases encountered in the early days of their practice which, in view of their more recently acquired knowledge of the disease, they felt quite positive were genuine cases of pellagra.

Considerable information of historic interest, all of which is in harmony with the above, has been accumulated from various sources. As early as 1864, Gray of New York, and Tyler, of Massachusetts, each reported a case of pellagra. Sherwell of New York reported cases in 1882 and 1902. Harris, of Georgia, reported a case complicating hookworm disease in 1902. In 1912, Babcock (2), a pioneer student of pellagra in this country, from a study of the clinical records of the South Carolina State Hospital for the Insane, and from personal interviews and correspondence with practitioners, asylum authorities, and others concerned, reached the conclusion that the disease had been continuously present in South Carolina at least since 1828. He also presented information indicating that the same may be said of many other sections of the South. Searcy (3), the first to report pellagra in endemic form in this country, states that there had been cases present but unrecognized at the Mount Vernon (Alabama) asylum each year at least since 1901. From a superficial survey of the Peoria (Illinois) State Hospital following the diagnosis of the first case, Siler and Nichols (4) found many cases present, and from their study of this institution they concluded that the disease had been present there

without recognition for not less than four years prior to the time of their investigation. Interesting reports of the experiences of practitioners and institution officials with the disease before they knew its nature are frequently encountered in the early American literature on pellagra, and the disease in endemic form has been traced back by various observers in various sections to 1885 and beyond.

In order to secure and place on record such information bearing on this point as was then (1916) available in the general vicinity of Spartanburg, S. C., a letter embodying the following request was addressed to those physicians who had entered general practice prior to 1903 as shown by the fourth edition 1914 of the American Medical Directory:

> The question as to the extent of pellagra in this section prior to its general recognition in the South in 1907 and 1908 is of unusual interest in connection with the present studies of the disease.
>
> It is therefore desired to utilize in this connection your long experience as a practitioner by requesting you to state, in the blank space below, the place of occurrence and date of your first case of sickness which, when considered in the light of your present knowledge, would justify a diagnosis of pellagra.
>
> Place of occurrence --
>
> Date of occurrence ------------------
>
> REMARKS
>
> --
>
> --
>
> --
>
> (Signature) ----------------------------

In all, 62 replies were received. Of this number, 38 reported having seen, prior to 1907, one or more cases of pellagra. Eighteen had not seen, or could not recall having seen, a case at an earlier date than 1907, two of this number reporting that they had never seen a case in their own practice at any time. Six were indefinite in their replies.

The cases reported as having been observed prior to 1907 are summarized by years of occurrence as follows:

Year	Cases	Year	Cases	Year	Cases
1885	1	1893	1	1901	2
1886	1	1894	1	1902	4
1887	1	1895	1	1903	9
1888	1	1896	0	1904	6
1889	1	1897	0	1905	5
1890	0	1898	2	1906	4
1891	0	1899	3		
1892	0	1900	2		

It will be noted that the 38 physicians report, in retrospect, a total of 45 cases and make reference to several more cases (though only

the earliest was requested) of a condition which, in the light of knowledge subsequently acquired, they believed was pellagra. The earliest case mentioned was observed in 1885 and, with a few exceptions, at least one such case was encountered each year thereafter by this comparatively small group of physicians.

There appears to be a general tendency toward an increase in the number of cases as the years advance. This may, in part at least, be due to the increasing number of physicians comprising this group, with a proportionate increase in the cases thus reported. However, the gradual shift in economic and dietetic conditions in this locality, brought about by changes in agricultural practices (increased production of cotton at the expense of foods and forage crops), as potential factors in bringing about an actual progressive increase in pellagra incidence during this period, can not be left out of consideration.

While no individual case reported under the circumstances can or should be regarded as unquestionably that of pellagra, the combined experience of this group of physicians becomes quite impressive when viewed as a whole. Further emphasis is afforded when it is considered that, in the present day, when pellagra is known to be quite prevalent in this locality year after year, and the probability of its occurrence and the nature of its symptoms are fully appreciated, not all the general practitioners see so much as one case per year. Two of the physicians replying to the previously mentioned request reported that they had not yet (1916) seen a case in their own practice. One of these entered practice in 1868, the other in 1895.

Interesting information bearing on this phase of the question is furnished by the epidemiological studies (5) of the Public Health Service conducted in portions of this field during 1916, 1917, 1918, 1919, 1920, and 1921. During this period the writer was in close touch with more than 50 local practitioners and believes that he had their cooperation in reporting their current cases to an unusual degree. The majority of them reported no more than a few (1 to 12) cases each year; many of them went as long as two years (1919–20) without encountering a single case, and some saw none at all during the entire 6-year period. In fact very few of these physicians reported a case of pellagra during the years 1919 and 1920. While the incidence was very low during these two years as compared with that of 1917–18 and 1921, the disease was by no means absent, as the house-to-house canvass conducted throughout this study fully demonstrated. In 1917 the incidence rate in a local community was found to be 99 per 1,000 population; in 1918, 83; 1919, 19; 1920, 14; and in 1921, 46, the last figure being more than three times that found in the same population during 1920 and more than twice the 1919 rate.

The situation becomes even more interesting when these earlier or prerecognition experiences are considered in connection with the information furnished by the house-to-house canvass conducted during 1917. The study that year included 24 cotton-mill communities, representing a population of 22,653, which furnished a total of 1,147 cases of pellagra, or a gross incidence of 50.6 per thousand persons. In 9 of the 24 villages, representing 478 cases of pellagra, it was practicable to check up with a fair degree of accuracy the proportion of the cases found by the method of house-to-house canvass that had actually been seen professionally by a physician. Of the 478 cases only 38 (7.9 per cent) had received professional attention during the attack. Making due allowance for all conceivable errors in this respect, it is conservatively estimated that of all the cases recorded during that year not more than 10 to 15 per cent came to the attention of a physician. As a rule, only the more severe and aggravated cases sought medical relief; and there are no good reasons for believing that such has not always been the case, except possibly during the short wave of pellagraphobia which immediately followed the general recognition of the disease. During this period, perhaps a somewhat larger proportion came to light through professonal channels.

The principal argument against the existence of pellagra in the South to any considerable extent prior to its general recognition in 1907–8 is the fact that it was not so recognized. This position may appear reasonably sound when taken at face value; but there are many valid reasons why the most competent physician might have failed to recognize the disease. Few of the older American textbooks on medical subjects mention it. Such well-known books as Flint's Practice of Medicine, published in 1866 and revised in 1880, American Text Book of the Theory and Practice of Medicine (1887), Musser's Medical Diagnosis (1896), and other standard works of that period make no reference to such a condition. In the first seven editions of Osler's Principles and Practice of Medicine the disease receives scant notice, the brief reference to it embodying the statement that "it has not been observed in the United States." In a later (eighth) edition of his work this author states that "it has probably been present in the South for 50 years."

At the very most the information regarding pellagra available to the average student of medicine in the United States prior to 1908 was that it is a disease of unknown or uncertain etiology, occurring in Italy and a few other places in southern Europe; that it involves the cutaneous, digestive, and nervous systems, producing a classical and essential diagnostic triad—dermatitis, diarrhea, and dementia; and last, but by no means less stressed, that it did not occur in the United States.

We now know that even this meager description contains some outstanding fallacies that could not do other than militate against the recognition of the disease, if, indeed, they did not produce a decided prejudicial effect against such a diagnosis in this country. The impression that a disease does not exist in a given locality is just as much a hindrance in arriving at a correct diagnosis as the knowledge of its continuous presence in endemic form is of assistance. It is no hidden secret that with all our knowledge of modern diseases the diagnosis of yellow fever or plague is made with less hesitancy and greater assurance where that particular disease is known to be endemic, to say nothing of the moral support often afforded in the diagnosis of such well-known diseases as smallpox or measles by a known epidemic. It is not at all improbable that prior to 1908 the average American physician was about as indifferent to the diagnosis of pellagra as are those of the most northern latitudes to the endemic existence of such conditions as sleeping sickness or leishmaniasis.

The reports of cases of pellagra published in 1864 and 1902 were mainly ignored or their authenticity was questioned until confirmed by the developments of later years. Babcock (2) quotes Dr. D. S. Pope, of Columbia, S. C., as stating that about 1885 he incorrectly ruled out the diagnosis of pellagra in two cases on the grounds that it "did not occur in the United States," and adds that he knows of others who have pursued a similar course "out of respect for authority."

The triad—dermatitis, diarrhea, and dementia—formerly almost universally held essential to the diagnosis of pellagra, is, relatively speaking, of rather infrequent occurrence when all types of endemic pellagra are considered. Such a combination of symptoms, as is now fully appreciated by most physicians familiar with the disease represents an advanced stage and is rarely encountered except in some of the more severe types. Of 313 admissions to the United States Pellagra Hospital at Spartanburg, S. C., 62.4 per cent had normal bowel movements at the time of admission, 17.2 per cent were constipated, and 20.4 per cent had looseness of the bowels. Of 421 unselected field cases, 80.5 per cent reported no bowel disturbance, 9.7 per cent had looseness of the bowels, and 9.7 per cent were constipated. All the hospital cases showed the presence of the characteristic skin eruption at the time of admission, as did the field cases at the time the information was obtained. Of 876 field cases under observation throughout the immediate attack, all of whom presented the skin eruption, 12 (1.4 per cent) showed definite mental involvement of a major order which might be considered attributable to the disease. Five of these terminated fatally while under observation.

In view of these and similar observations this so-called diagnostic triad is to be looked upon as an indication of severity or a terminal picture rather than the essential symptoms of the ordinary case. If

this diagnostic requirement were uniformly applied in the present day the reported morbidity would represent a still smaller fraction of the cases actually existing, and the indicated case fatality rate would be nearer 100 per cent than around 3 per cent, which, according to the best information available (5), is in the neighborhood of the correct figure for this locality.

Another factor worthy of mention that could conceivably have operated against the earlier recognition of pellagra is the ease with which the symptoms composing this triad may be confused with other and, at the time, better known conditions. The skin eruption might easily be, and is to this day, often confused with other forms of erythema and dermatitis, such as the various types of eczema, erythema multiforme, lupus erythematosus, ichthyosis, Raynaud's disease, ergotism, senile atrophy and pigmentation, vegetable poisoning, and ordinary sunburn. The diarrhea has been mistaken for intestinal tuberculosis, dysentery, etc. The mouth symptoms were often disposed of by simply classing them as stomatitis or glossitis from some local cause. In many instances they were believed to represent a form of scurvy. The mental symptoms typify some of the well known psychoses and could have been so classified. In other words, a most classical and well advanced case of pellagra might readily have been looked upon by those unfamiliar with the disease and not aware of the possibility of its occurrence as a complex produced by various conditions. This is the very nature of some of the early descriptions of the disease, and it is a notable fact that such entries in the clinical records of the South Carolina State Hospital and other southern insane asylums actually showed a compensatory decline following the recognition of pellagra (2). No other disease has enjoyed so many aliases. Asturian leprosy, alpine scurvy, erythema endemicus, scorbutic palsy, Lombardian leprosy, Italian elephantiasis, periodic erysipelas, mal de sole, and in this country scurvy with sunburn, psilosis pigmentosa, foot and mouth disease, etc., are some of the more outstanding misconceptions that have prevailed at one time or another. The chaos of the past can best be appreciated when it is considered that there are still some (6) who hold that pellagra is not a clinical entity.

It is not contended that this disease was as prevalent prior to 1907 as it was found to be during the years immediately following. In view of certain inevitable dietary readjustments resulting from shifting economic conditions which are now looked upon as the dominating factors in the epidemiology of the disease, there might easily have been, and it is probable that there was, an increase in incidence following the economic depression which began in 1907, as brought out by Sydenstricker, (7) just as there have been known increases following similar changes in 1915, 1921, and 1930. Granting that

there was "an explosive outbreak" which began in 1907-8, when all available information is considered one is led to wonder which was the more explosive in character, the actual increase in cases or the suddenly acquired knowledge of the disease and the realization of its presence aided by a rapidly spreading pellagraphobia and stock taking by physicians.

It is a question whether this apparent epidemic nature has not been overestimated, to the hindrance of some of the earlier investigations undertaken to clear up its etiology. Such prerecognition information as has been brought together offers meager support to the view, perhaps too commonly held, that pellagra made a sudden appearance in the South and quickly assumed epidemic proportions analogous to that of an infectious condition. In view of its undoubted endemic existence prior to that time, and with no reliable means of measuring its incidence before or even since, the generally accepted basic requirements for the recognition of an epidemic are not entirely applicable. However, several observers have been able to see in this situation what they regard as evidence, not only of a sudden and explosive appearance but, in a few instances, a definite radial spread and, apparently on these grounds alone, have held on to the view of infectious origin.

REFERENCES

(1) Goldberger, J., and Wheeler, G. A.: Pub. Health Rep., vol. 34 (1920), pp. 648-713.
(2) Trans. of the Nat. Assoc. for the Study of Pellagra (1912), Columbia, S. C., 1914, vol. 2, pp. 9-12. Am. J. Insanity, Baltimore (1912-1913), vol. 69, pp. 185-200.
(3) Searcy, G. H.: J. A. M. A. (1907), vol. 49, p. 37.
(4) Siler, J. F., and Nichols, H. J.: Medical Record, N. Y., (1910), vol. 77, pp. 87-98.
(5) Goldberger and others: Hygienic Laboratory Bulletin, No. 153 (1929).
(6) Editorial, J. A. M. A., vol. 96, No. 8, Feb. 21, 1931.
(7) Sydenstricker, E.: Pub. Health Rep., vol. 30 (1915), pp. 3132-3148.

SLEEPING CAR PARKING AND SANITATION AT A LARGE CONVENTION

By G. H. Ferguson, *Chief Sanitary Engineer, Department of Pensions and National Health*

During the period that Pullman and dining cars were parked in the coach yards at Toronto, Canada, in connection with the Masonic Shrine convention, June 9-12, 1930, the various official bodies concerned took measures to maintain a high standard of sanitary conditions. The railways concerned provided extra men and materials at

considerable expense. The Canadian Pacific Railway is stated to have spent over $100,000 in building and maintaining their special coach yards, which were known as "Fez City."

"Fez City"

This yard, located at the south end of Bathurst Street, was constructed expressly for the parking of coaches used as living quarters during the convention and was dismantled when no longer required for this purpose.

Hydrants, connected to the city water supply, were located at regular intervals throughout the yard, and steam-hose couplings were used on the hydrants and filling hose for ease in attaching them to the cars.

Ice was stored at the side of the yard in a refrigerator car, and, when required for use, was transported to the cars in metal wheelbarrows painted white. Special galvanized pails were used to carry broken ice into the cars. The service men were supplied with white uniforms and white rubber gloves.

Garbage and rubbish were collected in cans throughout the yard, open end carbide cans being used for the rubbish. From time to time these containers were taken to the disposal yard and emptied into city garbage wagons. Garbage and trash were disposed of at the city incinerator.

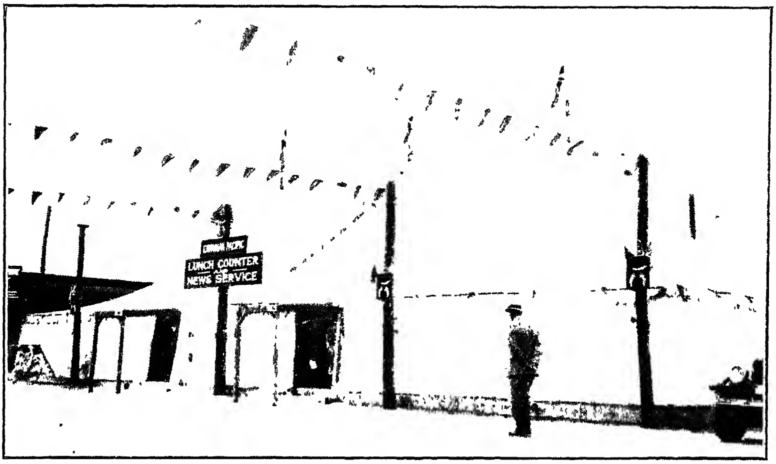
A special corrugated sheet metal building was constructed and equipped with 2-compartment showers. The outer compartment was provided as a dressing room and was supplied with a chair. The walls and doors of the showers were of sheet metal. Attendants supplied towels and soap. A charge of 50 cents was made for the entire service. Twenty shower compartments were provided for men and six for women. Toilets, latrines, washbasins, and a barber shop were also located in this building. One section, reserved for ladies, was equipped with toilets, washbasins, showers, and a sitting room.

In addition to the toilets in the coaches outside toilets were provided, those for the delegates being separated from those intended for the use of railway employees.

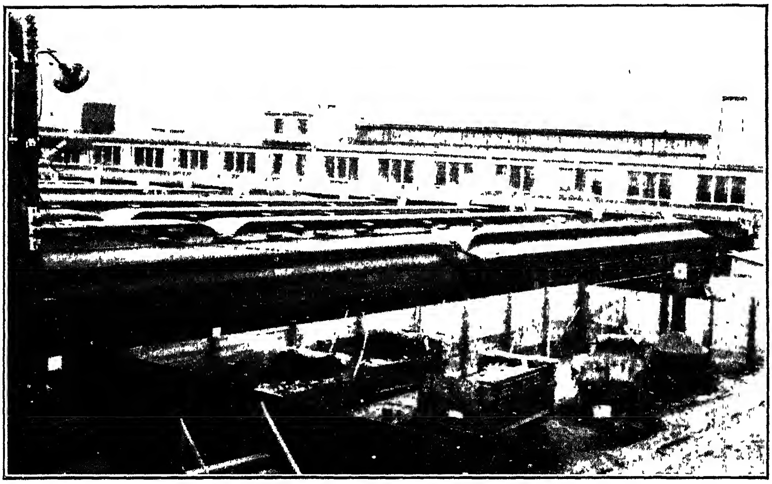
To provide toilet and bath facilities for porters employed on the cars an old box car was removed from its trucks, reconditioned, and fitted with necessary conveniences.

Waste water from the baths and toilets was conveyed to a city sewer.

Sewage disposal cans, 11 inches in diameter and about 35 inches long, were specially constructed for the collection of sewage from the cars. A 6-inch ring of galvanized metal, the same as that used in the cans, fitted into the top of the cans and a heavily oiled cloth was

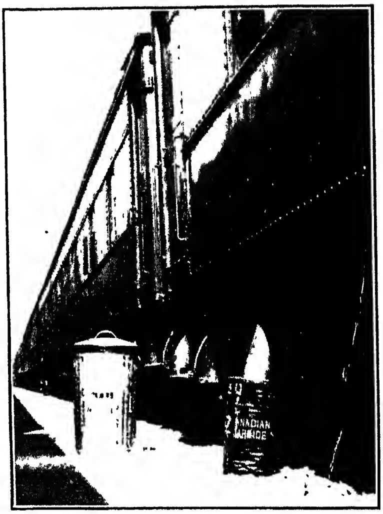


LUNCH COUNTER TENT AT THE ENTRANCE TO "FEZ CITY"



ARRANGEMENTS FOR GARBAGE REMOVAL AT "TEMPLE PARK"

NARROW GAGE TRACK, TEMPORARY PIPE LINE, HYDRANTS, AND TRUCK WITH ICE



SANITARY GARBAGE CAN IN POSITION

LIGHT STANDARD, CONCRETE WALK, AND WATER HYDRANT

SANITARY HOPPER

fastened to the inside of this ring. This cloth was wired around the toilet and waste pipe outlets when the can was in place. The cans were provided with handles for ease in handling. On the side of the tracks where no walks were provided 10-inch planks were nailed to the ties, providing a level base for the cans. Close-fitting metal covers were placed on the cans when transporting them to and from the disposal yards. Trucks hauled by a small motor were used in moving cans. The contents of the cans were emptied into 50-gallon wooden barrels provided with covers which could be clamped tightly in place. These barrels were then removed by truck and emptied into a city sanitary sewer. The sanitary cans were washed with water, and this water was discharged into a septic tank which overflowed into a city storm sewer. A plentiful supply of chloride of lime was available, and a strong solution was added to the effluent from the septic tank from time to time. After being washed, the cans were disinfected, then the covers were replaced, and the cans were again ready for use.

Between alternate rows of coaches, raised walks were built of clay and finely crushed rock, enough of the latter being included to provide good drainage. Electric lights were strung on wires supported by wooden poles located in these walks.

Two stationary locomotives provided steam for the coaches and hot water for the showers.

At the entrance to the yard two large tents were erected, one being used as a lunch counter and the other as an information bureau, telegraph office, and express office.

A frame administration building was located on an elevation at the western end of the yard.

Three hundred and twenty-eight coaches, including dining cars, were located in this yard.

In connection with the sanitary facilities provided for the 4,500 persons who were furnished sleeping accommodation at "Fez City," extra men were employed as follows:

Water supply, 12 men.

Ice supply, 12 men.

Sewage disposal handled by contractor with 45 men.

Garbage disposal and general yard cleaning, 55 men.

For handling the sewage between the Pullman cars and the point of disposal in a city sanitary sewer 1,600 cans of the type described were specially manufactured.

Special precautions taken in connection with sewage disposal included the screening of sewer hopper to prevent clogging, protected covering between toilet outlet and sanitary can, and provision for disinfection of sanitary equipment and grounds around disposal sheds and cars

"Temple Park"

While no definite figures are at hand regarding the exact amount of money that was spent by the Canadian National Railway system in their special coach yard, which was named "Temple Park," it has been unofficially stated that the railway company spent as much on parking and sanitary facilities as did the Canadian Pacific Railway Co.

A letter from the assistant general passenger agent of the Canadian National Railways at Toronto contains the following statement:

> I am pleased to advise you that Canadian National Railways parked 375 Pullmans in their parking location at Toronto last week. We estimate there were just over 7,000 passengers taken care of by this means. Sanitary arrangements received exceptional attention, and our complete facilities were very well commented upon by our visitors, also by representatives of the Pullman Co. and by American railway lines officials who were used to the handling of this very large convention each year.

The chief engineer for the central region of the Canadian National Railways has supplied the following data with respect to temporary facilities that were made available in their special parking area known as "Temple Park."

The number of extra employees required to handle the equipment in the parking area amounted to 248, of which 189 were required for taking care of what might be considered sanitary conditions, as follows:

Sanitary arrangements, 103.
Watering cars, 30.
Icing cars, 30.
Collecting garbage, 14.
Cleaning yards, 12.

The remainder of the employees making up the total of 248 consisted of electricians, pipe fitters, 4 janitors who looked after the administration building, 2 car inspectors, 2 oilers, 6 coal men for coaling dining cars, and 2 firemen for looking after the steam boiler in the Annex.

Water for drinking, culinary, washing, and sanitary purposes was supplied through hydrants connected to the city water service and spaced at regular intervals throughout the yards. Standard hose coupling connections were used in attaching the service hose to the hydrants. The filling end of the hose was cut off square and when not in use was protected by a metal cylinder, with a closed end, which fitted snugly over the hose.

Artificial ice was used and was stored in a special ice house at one side of the yard until it was needed. Service men were supplied with white uniforms and some used white rubber gloves. The ice was transferred to the cars on flat baggage trucks, and, when broken up, was carried into the coaches in galvanized iron pails.

Sanitary cans were provided at the rate of six per car, which included one per car for garbage. Old carbide cans were used, with a capacity of about 8 gallons, the dimensions being 12 inches in diameter by 19 inches in length. A can of this size could be easily handled by one man. A quarter inch round handle was attached to the sanitary can, and the top of the can was cut out so as to give a full opening. There were two styles of covers—one with a hole for the chute, which was attached to the bottom of each hopper, and the other a solid lid to be used while cans were being moved through the coach yard between the cars and the sewage-disposal shed. A solid lid was also used to cover the garbage cans.

In all, 3,000 sanitary cans were provided to supply the two Canadian National Railway yards and 2,400 pipe connections for these cans were also available.

Chutes were arranged with flanged collars so that covers would not slip off while a chute was suspended from a passenger car and the can removed. Chutes were fastened under each toilet hopper with fine iron wire as quickly as possible after the trains arrived.

Galvanized iron hopper connections were made to the sanitary sewer in three different locations in the yard for the dumping of soil cans. At each location two hoppers were installed in an inclosure, a removable screen being placed in each hopper. Two cans could be dumped at the same time, or, if the screen had to be removed from one hopper on account of being clogged, the other remained in service, thus insuring provision for the continuous discharge of sewage. It was found necessary to remove these screens at frequent intervals as they would otherwise have been choked up by bottles and other rubbish that was passed through the toilets on the Pullman cars.

It was usually necessary to empty the sanitary cans three times each day, although some of them required more frequent attention. After being emptied, the cans were sprayed on the inside with a disinfecting solution and then were covered with full-sized lids. While being moved through the coach yards the truck loads of sanitary cans were covered with tarpaulins. During the daytime hand trucks were used for distributing the sanitary cans, but after nightfall, when the coach yards were free from people, a gasoline power truck with two trailers was used, thereby speeding up the work.

A disinfecting solution was used around the cans under the cars and also in the buildings where the hopper sewer connections were located.

One hundred and six special shower baths were provided for men (10 for the use of railway employees) and 71 for women, the wash water from these shower baths being disposed of by discharge connections to a storm sewer. Both hot and cold water was available in these shower baths.

A layer of sand and gravel about 3 inches deep was laid in the main coach yard between the concrete platforms and the rails and was useful as an absorbant of water that was spilled or splashed.

Water from the kitchens of dining cars was a little more difficult to handle. It was partially taken care of by placing cans under some of the kitchen sinks, the cans being replaced as they became filled. In a special instance where a group of seven dining cars were close together a shallow hole was dug into which the water drained, being afterwards pumped to the nearest storm sewer through temporary pipe lines.

Both the Canadian Pacific and Canadian National Railways made special provision for handling the personal laundry of the delegates, and they also provided rest rooms, barber shops, beauty parlors, and telegraph and telephone facilities.

No undesirable odors were noticed throughout the yards at any time and very few flies were seen.

THE CATALYTIC ACTION OF COPPER IN THE OXIDATION OF CRYSTALLINE GLUTATHIONE

By Carl Voegtlin, *Chief of Division of Pharmacology;* J. M. Johnson, *Senior Chemist;* and Sanford M. Rosenthal, *Senior Pharmacologist, National Institute of Health, United States Public Health Service*

The chemical isolation of *crystalline* glutathione from yeast and animal tissues by Hopkins (1929) and by Kendall, McKenzie, and Mason (1929) offers an opportunity to study under varying conditions the chemical and physiological conduct of this interesting cellular constituent. Glutathione is a tripeptide composed of glutamic acid, cysteine, and glycine and probably has the following constitution:

$$\begin{array}{l} \quad\ \ COOH \qquad\qquad HSCH_2 \\ \quad\quad\ | \qquad\qquad\qquad\ \ | \\ H_2NCHCH_2CH_2CONHCHCONHCH_2COOH \end{array}$$

Like other sulphydryl compounds, glutathione is supposed to undergo, according to conditions, a reversible oxidation as follows:

$$2\ RSH \rightleftarrows RS{-}SR + 2H$$

In the case of cysteine it was formerly assumed that in aqueous solution of approximately pH 7, molecular oxygen converts cysteine into cystine, but Warburg and Sakuma (1923) clearly showed that this oxidation is conditioned by the presence of minute amounts of iron or copper salts. The conversion of cysteine to cystine by molecular oxygen is therefore no longer considered as an autoxidative process, but rather as a heavy metal catalysis. This view has gained favor from subsequent researches, particularly those of Michaelis (1929). The cysteine oxidation is catalyzed by iron, copper, and manganese, but not by nickel and cobalt salts.

Observation made with the *amorphous* impure SH glutathione, prepared by the original Hopkins method (1921) seemed to indicate that traces of iron or copper salts can function as catalysts in the conversion of the substance to its disulphide form. (Harrison, 1924.) However, Meldrum, and Dixon (1930) recently found that the *crystalline* glutathione prepared according to Hopkins (1929) behaved quite differently. They found the rate of oxygen uptake of crystalline glutathione, dissolved in phosphate buffer of pH 7.6, to be considerable lower than that of the amorphous product. They conclude, furthermore, that "whereas the addition of a trace of iron or copper salt greatly accelerates the uptake of oxygen by cysteine or impure glutathione, the oxidation of crystalline glutathione is not accelerated at all by the addition of iron or copper at pH 7.6 or by hematin in low concentrations. With larger amounts of hematin, however, a definite acceleration is produced, although the catalytic activity is still small compared with that observed with cysteine." By a rather involved series of experiments on the rate of oxidation of crystalline glutathione treated with a thermostable muscle powder or kaolin, they arrive at the conclusion that "the autoxidation of glutathione depends on the cooperation of two factors, present in traces as impurities in the glutathione preparations, namely, iron (or copper) and some substance able to form catalytically active complexes with metals. With crystalline glutathione the rate of oxidation is limited by the amount of the second factor present, and not by the iron."

In view of the importance of these conclusions we decided to submit the oxidation of crystalline glutathione to a reinvestigation.

METHODS AND MATERIALS

The oxygen consumption was measured in the same Barcroft-Warburg microrespiration apparatus as used in our recent work on the oxygen consumption of tissues. The respiration vessels were provided with a side arm, which permitted the addition of solutions of chemicals to the solutions in the main compartments.[1] The final volume of fluid in the main compartments was in all experiments 2.6 c. c. All experiments were carried out at 37.6° C. Air used was as a source of oxygen. The respiration vessels, pipettes, and other glassware were freed from heavy metal impurities by treatment with chromic acid cleaning fluid, followed by thorough rinsing with water twice distilled in a pyrex-glass apparatus. This specially distilled water was also used for preparing the solutions of glutathione, cysteine, etc.

[1] The glutathione was placed in the main compartment and the metallic compounds and salts in the side arm. Unless otherwise stated the solutions in the side arm were added to the glutathione solutions a short time before the readings were begun. The total oxygen uptake was not ascertained by this procedure, because the object of the work was to study *rates* of oxidation as accurately as possible.

Several different lots of crystalline glutathione were prepared—samples A and B according to the Hopkins method; samples C and D by a slight modification of the Kendall method, using mercuric sulphate for the last precipitation with heavy metal salt. A few experiments were done with a sample of crystalline glutathione kindly supplied by Doctor Kendall. All of these samples had a uniform crystalline appearance, and their total nitrogen and total sulphur agreed fairly well with the values called for by theory. The cysteine hydrochloride was specially prepared by the Warburg method (1927), which yields a product free from all but infinitesimal amounts of catalytic metals. The kaolin which was used for the treatment of glutathione solutions was boiled several times with ordinary c.p. HCl, then with specially glass distilled HCl, and was finally washed free of acid with twice glass-distilled water. Hemin was prepared from oxblood by the glacial acetic method and recrystallized from pyridine-chloroform-glacial acetic. Part of this hemin was converted into protoporphyrin. (Fischer and Pützer, 1926.) The pH of the phosphate buffers of Clark was determined with the hydrogen electrode, that of the pyrophosphates by a carefully calibrated glass electrode. The hemin was converted into hematin solution by the addition of the necessary amount of a NaOH solution which had stood for a long time in order to remove catalytic metals. Warburg's (1927) recommendations were followed throughout the work in order to avoid the unintentional introduction of heavy metal impurities into the solutions.

The iron salts and hemin were analyzed for the presence of traces of copper. Considerable difficulties were met in this work, and only after testing several methods was it possible to obtain reliable results. The procedure finally adopted was the following: The ferric ammonium citrate and hemin were first *completely* oxidized by prolonged boiling with a mixture of copper free H_2SO_4 and HNO_3. The excess HNO_3 was then removed by boiling and the remainder was diluted with glass-distilled water. From here on the procedure was the same as that with the inorganic iron salts. The solutions were poured into an excess of glass-distilled NH_4OH. Under these conditions it was shown that the excess NH_4OH prevents the precipitation or adsorption of the traces of copper. After some standing the ferric hydroxide was filtered off and washed with glass-distilled NH_4OH. The filtrate was concentrated by boiling and the copper was determined by the procedure of Elvehjem and Lindow (1929). One gram of substance contained the following amounts of copper in milligrams: Ferric chloride, 0.0017; ferrous ammonium sulphate (Mohr's salt), 0.013; ferric ammonium sulphate, 0.0009; ferric ammonium citrate, 0.0389; hemin (once recrystallized), 0.0165; and recrystallized five times, 0.0088.

RESULTS

Effect of iron and copper salts.—We have been able to confirm the findings of Meldrum and Dixon (1930) that the oxidation of crystalline SH glutathione is not catalyzed by iron salts. Various iron salts were employed, ferric chloride, ferrous ammonium sulphate, ferric ammonium sulphate, sodium ferric tartrate, and ferric ammonium citrate. Experiments were done in water, Locke's solution (pH 7.7), phosphate buffer (pH 7.5 to pH 8.24), and in pyrophosphate buffer. In no instance was there an effect on the oxidation of glutathione which could be ascribed to the added iron. When *large* amounts of some iron salts were used, a very slight effect on oxidation rate was noticed, but this could be ascribed to the traces of copper with which some of these iron salts were shown to be contaminated (see analytical results in preceding paragraph); for in the above experiments copper salts, similar to the iron salts, were also studied, and in every case a high degree of catalytic activity was present.

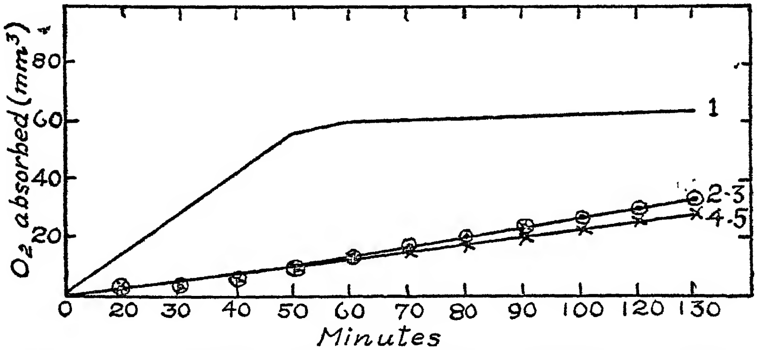


CHART 1.—The catalytic action of inorganic copper and the absence of effect of iron on the oxidation of 5 mg. glutathione C (Kendall) in Locke's solution, pH 7.7. Curve 1: Glutathione +0.001 mg. Cu (as $CuCl_2 2H_2O$). Curves 2, 3, and 4: Glutathione +0.01 mg., 0.002 mg., and 0.001 mg. Fe (as $FeCl_3.6H_2O$), respectively. Curve 5: Glutathione alone

The inorganic salts of iron or copper form relatively insoluble phosphates when added to alkaline phosphate buffer, and so Locke's solution (pH 7.7) was employed to study the effect of cupric and ferric chloride. In Chart 1 it is seen that 0.001 mg. of copper as cupric chloride caused a rapid oxidation of glutathione, while 0.01 to 0.001 mg. of iron as ferric chloride had little or no effect on the oxidation rate of 5 mg. of glutathione C.

The citrates and tartrates of iron and copper are not easily precipitated from slightly alkaline solutions, and so these salts were employed to study the effect of iron and copper on glutathione in phosphate buffers. In a phosphate buffer of pH 7.5, 0.001 mg. of copper as sodium cupric citrate had a marked catalytic action, while 0.01 mg.

of iron as ferric ammonium citrate was without effect on the oxidation of glutathione D (Chart 2).

Advantage was next taken of the observation of Meldrum and Dixon (1930) that kaolin would remove traces of catalytically active metals from a solution of crystalline glutathione, and so the kaolin

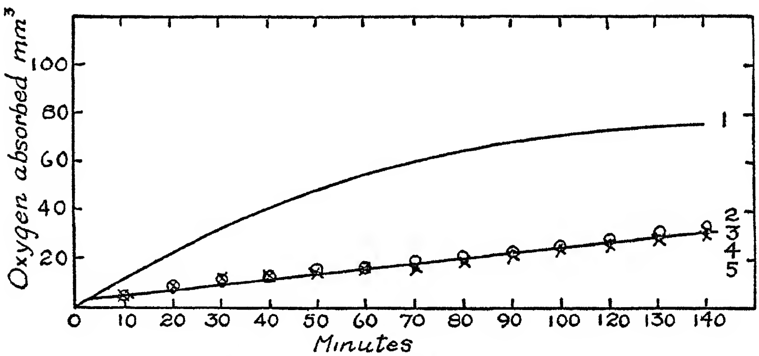


CHART 2.—The effect of copper and the absence of effect of iron citrate on 5 mg. glutathione D (Kendall) in phosphate buffer, pH 7.5. Curve 1: Glutathione +0.001 mg. Cu (as sodium cupric citrate). Curves 2, 3, and 4: Glutathione +0.01 mg., 0.002 mg., and 0.001 mg. Fe (as ferric ammonium citrate), respectively. Curve 5: Glutathione alone

treated product became "stabilized" and did not undergo oxidation, unless a heavy metal catalyst was supplied. Meldrum and Dixon concluded from their observations that the traces of cysteine alleged to be present in crystalline glutathione are not removed by kaolin treatment, and therefore that the metal-cysteine complex could be

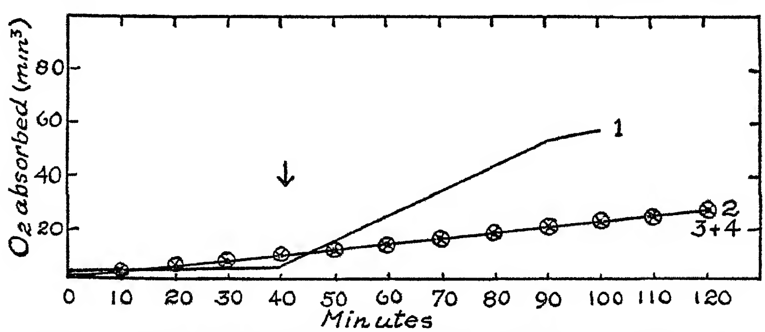


CHART 3.—The absence of effect of 0.05 mg. hematin with or without 0.1 mg. cysteine on the oxidation of 5 mg. glutathione in phosphate buffer pH 7.5. Curve 1: 2 mg. cysteine. Curve 2: Glutathione A (Hopkins). Curve 3: Glutathione A (Hopkins) +0.1 mg. cysteine. Curve 4: Glutathione C (Kendall) +0.1 mg. cysteine. 0.05 mg. hematin added to all vessels at time indicated by arrow

reformed when iron or copper is added to the kaolin-treated glutathione. In our initial experiments it was found that the addition of *small* amounts of hematin or sodium ferric tartrate along with *small* amounts of pure cysteine to glutathione did not accelerate the rate of oxidation of the latter substance. (Chart 3.) This, according to

Meldrum and Dixon, might be due to an optimum amount of iron being already present, so that further additions were ineffective. Experiments were accordingly carried out with kaolin-treated glutathione,[2] in which the ability to take up oxygen had been reduced to a negligible degree. We were unable to confirm the observation of Meldrum and Dixon that iron salts are capable of appreciably increasing the oxygen uptake of such a glutathione preparation. On the other hand, the catalytic action of copper salts was very pronounced. In Chart 4A is shown the negligible effect of 0.1 mg. of iron as ferric ammonium citrate, the absence of effect of 0.01 mg. of iron as ferrous ammonium sulphate, and the pronounced catalytic action of 0.0001 mg. of copper as sodium cupric citrate. In this experiment glutathione C, prepared according to Doctor Kendall's technique, was em-

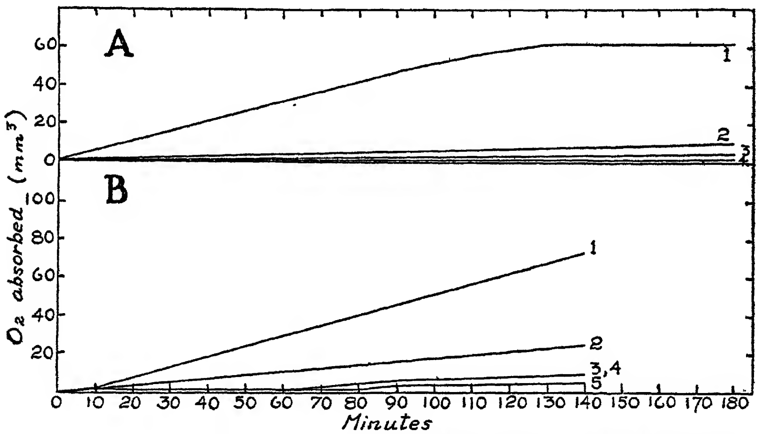


CHART 4.—A. The activity of copper salts and lack of effect of iron salts on 5 mg. glutathione C (Kendall) which had been freed from heavy metals by kaolin treatment. Phosphate buffer, pH 7.5. Curve 1: Glutathione +0.0001 mg. Cu (as sodium cupric citrate). Curve 2: Glutathione +0.1 mg. Fe (as ferric ammonium citrate). Curve 3: Glutathione alone. Curve 4: Glutathione +0.01 mg. Fe (as ferrous ammonium sulphate)

B. Similar results obtained with a sample of glutathione supplied by Doctor Kendall. Curve 1: 5 mg. kaolin-treated glutathione +0.0001 mg. Cu. Curve 2: Glutathione (without kaolin treatment) alone. Curve 5: Kaolin-treated glutathione alone. Curves 3 and 4: Kaolin-treated glutathione +0.02 mg. Fe (as ferric ammonium citrate) and glutathione +0.01 mg. Fe (as ferrous ammonium sulphate). All experiments in phosphate buffer, pH 7.5.

ployed. Similar results were obtained upon a sample of glutathione prepared in Doctor Kendall's laboratory, as is shown in Chart 4B.

EFFECT OF HEMATIN

Hematin behaved differently from the iron salts studied. We obtained results similar to those of Meldrum and Dixon, who found that small amounts (0.05 mg.) of hematin did not accelerate the oxidation of glutathione, while larger amounts (0.5 mg.) had a pro-

[2] The glutathione was dissolved in phosphate buffer, the kaolin was added, and the mixture was shaken for a few minutes. The kaolin was then removed by centrifugation.

nounced effect. (Charts 3 and 5.) The absence of catalytic action of small amounts of hematin was not affected by the addition of 0.1 mg. of cysteine to the glutathione solution. This clearly indicates, as with the iron salts, that the oxidation of crystalline glutathione is not necessarily dependent on the presence of a metal-cysteine complex.

At first it was believed that the action of large amounts of hematin was due to its copper content. Chemical analysis of the sample showed it to contain about 0.017 mg. copper per gram. An attempt was made to obtain copper-free hemin, but without success. After five recrystallizations from pyridine, chloroform, and glacial acetic, the copper content was 0.0088 mg. per gram of hemin. However, further investigation revealed that the action of hematin depends on the structure of the compound and can not be explained on a basis of inorganic copper content. This was shown in the following manner:

Warburg (1927) had found that the catalytic activity of iron salts on cysteine was inhibited in the presence of pyrophosphate, while

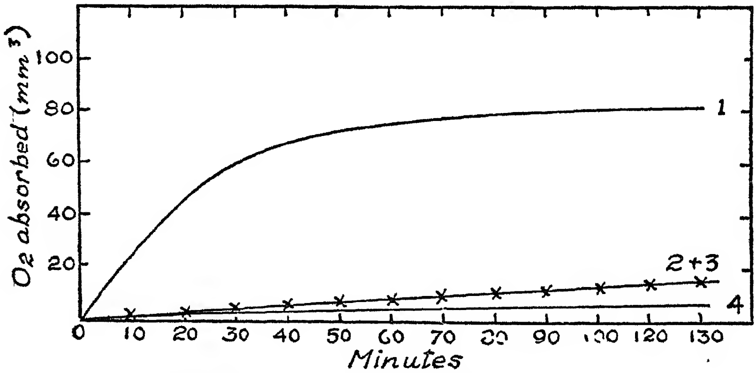


CHART 5.—The catalytic effect of a large amount of hematin on 5 mg. glutathione B (Hopkins), kaolin-treated. Curve 1: Glutathione +0.5 mg. hematin. Curves 2 and 3: Glutathione +0.05 mg. hematin and glutathione +0.05 mg. hemin +0.1 mg. cysteine. Curve 4: Glutathione alone. All experiments in phosphate buffer, pH 7.5

copper catalysis proceeded with a high coefficient of activity. Warburg (1927) evolved a method for the estimation of minute amounts of copper based upon this principle. Elvehjem (1930) extended these observations and studied the effects of pH, temperature, and concentration of solutes on the reaction. These investigators did not employ hematin in their studies, and assumed that all iron compounds were inactive on cysteine in pyrophosphate solutions.

When we employed this cysteine oxidation method to estimate the copper content of hematin, it was found that hematin retains its activity on cysteine oxidation in pyrophosphate buffer. The extent of activity is somewhat less than in phosphate buffer and the rate does not proceed as a linear function, but proceeds with decreasing velocity as a function of time.

Since hematin retains its accelerating action on the oxidation of cysteine in pyrophosphate as well as phosphate buffer, it was necessary to prove that this activity was not due to the traces of copper which it contained. In Chart 6B is shown the effect of hematin on the oxidation of cysteine in pyrophosphate buffer. When the hemin iron is reduced to inorganic iron by ashing the hemin, this effect is almost completely abolished. Ten mg. of hemin in a covered quartz crucible were completely ashed in an electric oven at 600° C. for four

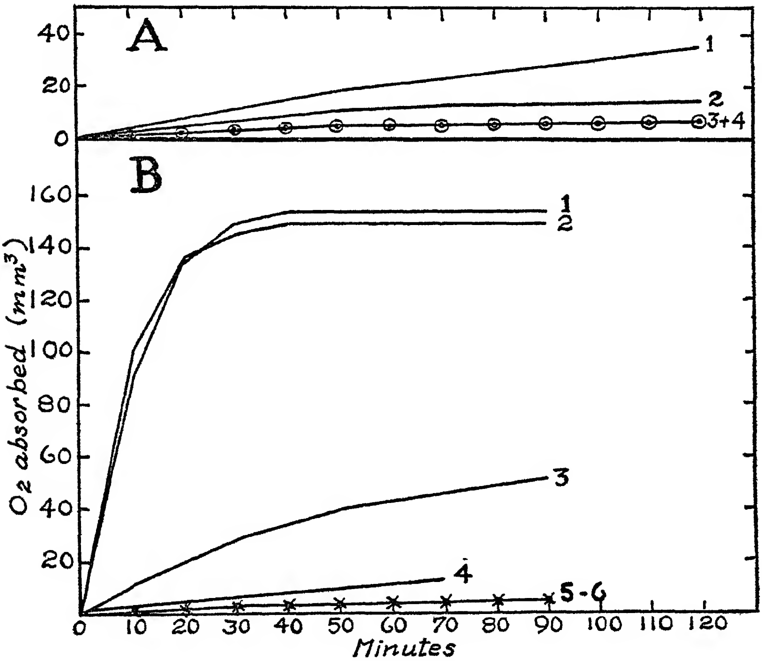


CHART 6.—A. The effect of hemin ash on cysteine oxidation in M/5 pyrophosphate, pH 7.67. The hemin was ashed at 600° C. for four hours. Curve 1: 6 mg. cysteine HCl + ash of 0.5 mg. hemin + 0.0001 mg. Cu (as sulphate). Curve 2: 6 mg. cysteine HCl + ash of 0.5 mg. hemin. Curve 3: 6 mg. cysteine HCl + acid extract of empty quartz vessel used as control. Curve 4: 6 mg. cysteine HCl alone. By comparison of the effect of hemin ash with that of the copper, 0.5 mg. hemin contains 0.000075 mg. Cu.

B. The effect of hematin and protoporphyrin on cysteine oxidation in pyrophosphate, pH 7.67. Curve 1: 6 mg. cysteine HCl + 0.5 mg. hematin + 0.0001 mg. Cu. Curve 2: 6 mg. cysteine HCl + 0.5 mg. hematin. Curve 3: 6 mg. cysteine HCl + 0.05 mg. hematin. Curve 4: 6 mg. cysteine HCl + 0.5 mg. protoporphyrin. Curve 5: 6 mg. cysteine HCl + 0.005 mg. Fe (as ferric ammonium citrate). Curve 6: 6 mg. cysteine HCl alone

hours. The residue was dissolved in glass-distilled normal hydrochloric acid by heating over a water bath for one hour. The effect of the hemin ash on cysteine in pyrophosphate is shown in Chart 6A. This residual effect is presumably due to the traces of copper which hemin contained. By comparing this effect with that of 1×10^{-4} mg. of copper, after the technique of Warburg, it was calculated that the hemin contained approximately 0.075 mg. of copper per gram. The

error in this method is probably large, because of the great excess of iron present.[3] This value is considerably higher than that obtained by the Biazzo method.

The fact that complete ashing of hemin destroys its accelerating action on the oxidation of cysteine in pyrophosphate demonstrates that the action of hemin is dependent on its intact structure. Another possibility is that the traces of copper in hematin are present as an extremely active catalytic organic complex, which is destroyed by ashing. Further evidence was obtained, however, to support the

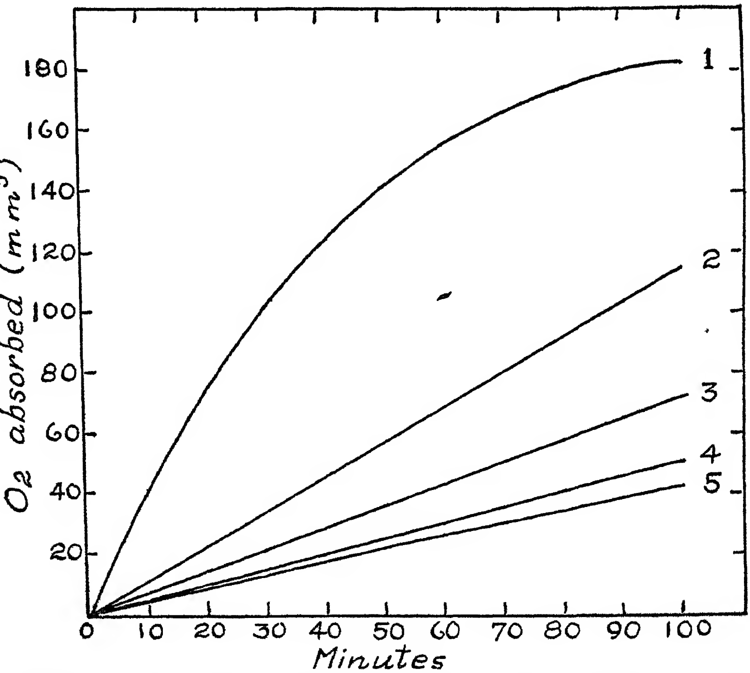


CHART 7.—The effect of recystallized hemin (0.5 mg.) and of hemin ash on the oxidation of 15 mg. glutathione C (Kendall) in pyrophosphate, pH 7.63. Curve 1: Glutathione +0.5 mg. hematin. Curve 2: Glutathione +ash of 0.5 mg. hemin +0.0001 mg. Cu. Curve 3: Glutathione +ash of 0.5 mg. hemin. Curve 4: Glutathione alone. Curve 5: Glutathione +0.05 mg. hematin (unashed). By comparison of effects of hemin ash with that of copper, 0.5 mg. hemin contains 0.00006 mg. Cu.

belief that the hematin effect in pyrophosphate is dependent upon the iron as it occurs in the hematin molecule. Experiments done under identical conditions with protoporphyrin showed very little effect on the oxidation of cysteine in pyrophosphate. The effect was of the same order of magnitude as that produced by the hemin ash, and could be explained by the trace of copper contained in the protoporphyrin. (Chart 6B.)

[3] The Warburg method is not reliable for the quantitative estimation of copper in the presence of proportionately large amounts of iron.

Glutathione is affected by hematin in *pyrophosphate* in a manner similar to the effect obtained in phosphate buffer. Large amounts of hematin (0.5 mg.) accelerate oxidation, while smaller amounts (0.05 mg.) are ineffective. This is shown in Chart 7, where it is also seen that the ash of 0.5 mg. hemin retains only a small fraction of the activity of the unashed compound. When the activity of the hemin ash on glutathione is compared with that of a known quantity of added copper, it is observed that the copper content of the hemin

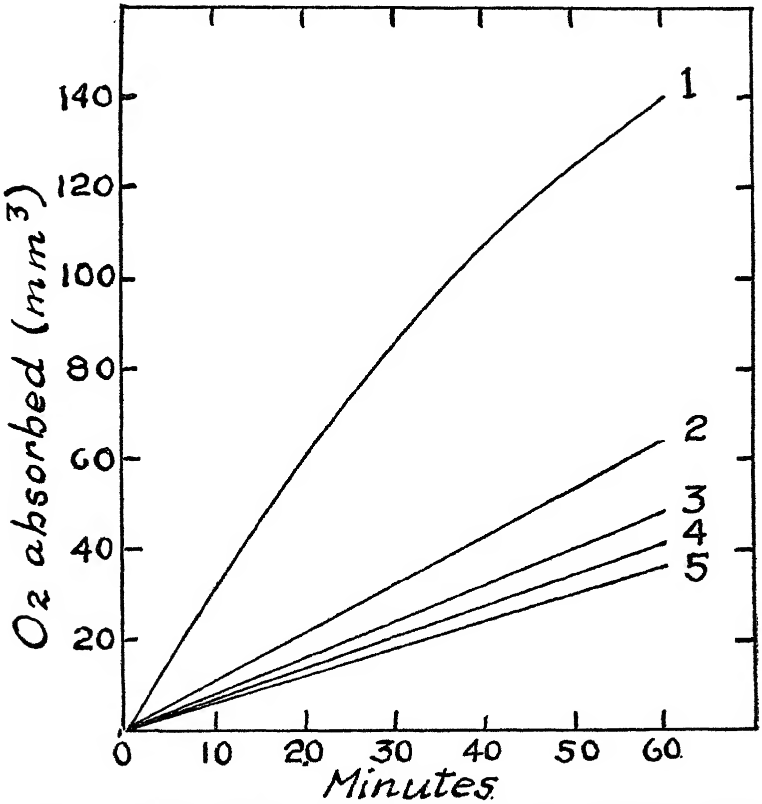


CHART 8.—The effect of varying amounts of hematin and of hemin ash on the oxidation of 15 mg. glutathione C (Kendall) in pyrophosphate, pH 7.63. Curve 1: Glutathione +0.5 mg. hematin. Curve 2: Glutathione +0.25 mg. hematin. Curve 3: Glutathione +ash of 0.5 mg. hemin. Curve 4: Glutathione alone. Curve 5: Glutathione +0.1 mg. hematin.

ash is 0.06 mg. of copper per gram hemin, which is in agreement with the figure obtained by the cysteine method. We have shown in other experiments, which will not be described here, that iron salts do not affect the oxidation of glutathione in pyrophosphate buffer.

To determine at what concentration of hematin the effect becomes manifest, varying concentrations were added to glutathione in pyrophosphate buffer. The results are shown in Charts 7 and 8. Accel-

eration of oxidation begins between concentrations of 0.1 mg. and 0.25 mg. of hematin in the glutathione solutions of 2.6 c. c. volume; 0.1 mg. and 0.05 mg. of hematin seem to produce a very slight inhibition of oxidation in contrast to the accelerating effect of larger amounts. These results are shown graphically in Chart 9, where the effect of varying amounts of hematin on the oxidation of glutathione is plotted

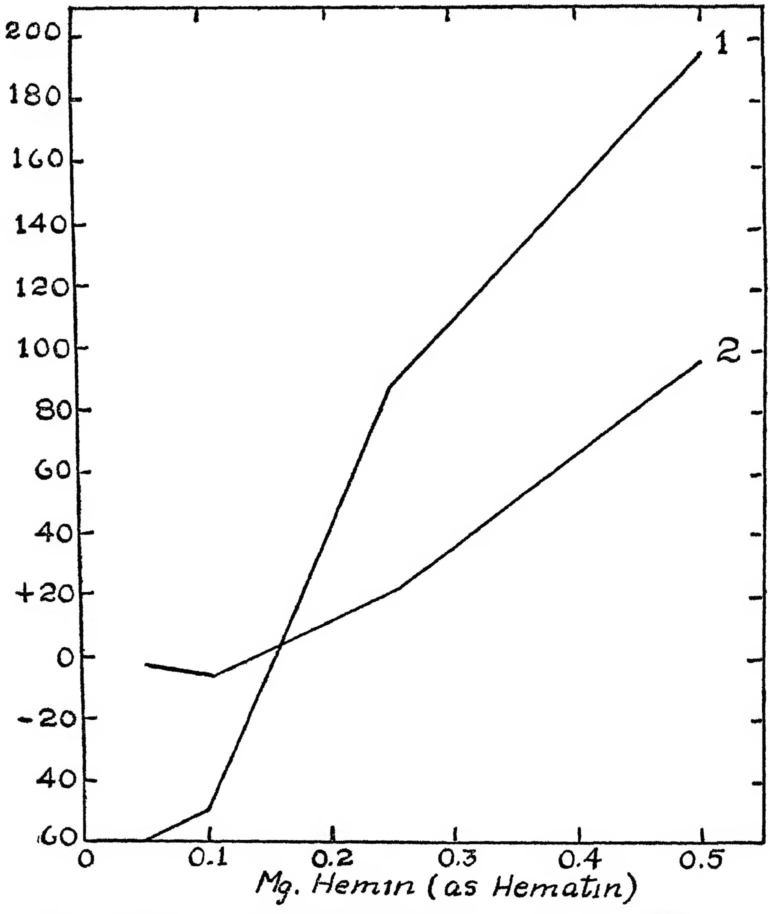


CHART 9.—The activity of various amounts of hematin on 15 mg glutathione in M/5 pyrophosphate, pH 7 63 Curve 1 represents Warburg's coefficient $\frac{\text{mm}^3 \text{ of } O^2}{\text{mg hematin} \times \text{hours}}$, produced by the hematin. In Curve 2 the oxygen consumption (mm.^{3}) for the first hour is plotted against increasing amounts of hematin

in terms of mm.^{3} increase or decrease of oxygen consumption per hour and as the activity coefficient. (Warburg's "Wirkungs Koefficient.")

The activity of hematin is relatively feeble as compared to copper.—The following values will illustrate the approximate activity of copper and of hematin in M/5 pyrophosphate on cysteine and glutathione:

Catalysis of 6 mg. cysteine hydrochloride n pyrophosphate at pH 7.67

	Catalytic coefficient
0.5 mg. hemin (as hematin)	12, 000
0.005 mg. hemin (as hematin)	9, 000
0.0001 mg. Cu. (as copper ammonium sulphate)	195, 000

Catalysis of 15 mg. glutathione in pyrophosphate at pH 7.63

0.5 mg. hemin (as hematin)	200
0.05 mg. hemin (as hematin)	0
0.0001 mg. Cu	320, 000

Effect of pH on copper catalysis of glutathione.—Warburg (1927) showed that the copper catalysis of cysteine in pyrophosphate has an optimum of activity at approximately pH 7.6. Elvehjem (1930)

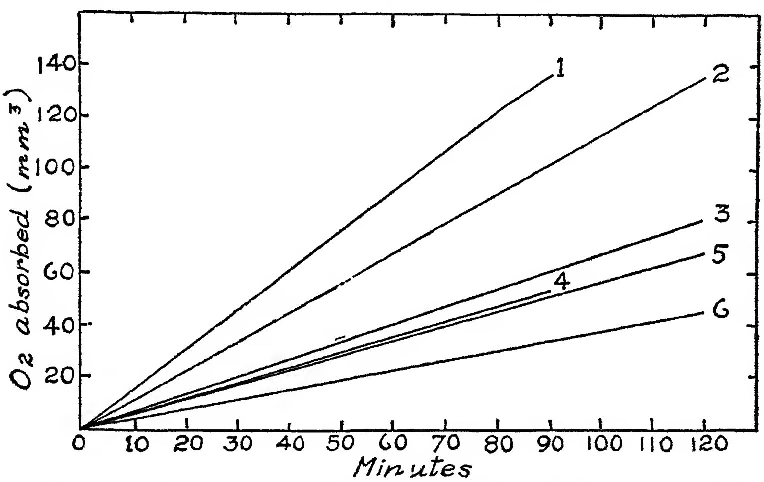


CHART 10.—The effect of pH on the activity of copper as a catalyst of glutathione B (Hopkins). In all experiments 15 mg. of glutathione and 0.0001 mg. of Cu (as cupric ammonium sulphate) in M/5 pyrophosphate were employed. Curves 1 and 4: Glutathione with and without Cu at pH 7.68. Curves 2 and 5: Glutathione with and without Cu at pH 7.1. Curves 3 and 6: Glutathione with and without Cu at pH 6.6

extended these observations and concluded that the decrease in activity on the alkaline side is due to the formation of insoluble copper salts, while the decrease on the acid side is due to the formation of an inactive copper-cysteine complex.

The copper catalysis of glutathione in M/5 pyrophosphate behaves similarly to that of cysteine. There is a decrease in activity below pH 7.7. This is represented in Chart 10, where the oxygen uptake of 15 mg. glutathione B (Hopkins) is shown at various hydrogen-ion concentrations with and without the addition of 0.0002 mg. of copper

(as cupric ammonium sulphate). Calculated in terms of Warburg's coefficient $\frac{mm.^3O_2}{mg.\,Cu. \times hours}$, the following values are obtained, with Warburg's results with cysteine given for comparison:

Copper catalysis of glutathione		Copper catalysis of cysteine (after Warburg)	
pH	Coefficient	pH	Coefficient
7.68	320,000	8.03	482,000
7.1	125,000	7.63	900,000
6.6	85,000	7.15	416,000

The "autoxidation" of crystalline glutathione.—As stated in the introductory remarks, the "autoxidation" of cysteine has been shown to be due to the presence of traces of certain heavy metals; and when these metals are eliminated, as far as this is possible, the rate of oxygen uptake of cysteine solutions sinks to a very low level. The solutions of crystalline glutathione which we have employed take up oxygen at a rate greater than that of purified cysteine, and it appears from our preceding experiments that there should be present in the glutathione crystals appreciable traces of copper or some metal other than iron, capable of catalyzing the oxidation of glutathione. Analysis of the ash of glutathione verified this assumption.

One hundred mg. of crystalline glutathione B (Hopkins) was ashed in an electric furnace in a covered quartz crucible at 600° C. for three hours. An empty quartz crucible was similarly treated as a control. One c. c. of glass-redistilled normal hydrochloric acid was added to each crucible and allowed to stand for 30 minutes. Four respiration vessels were set up as follows:

Main vessel

2 c. c. Pyrophosphate. 0.1 c. c. N/1 NaOH. 0.1 c. c. H_2O.	2 c. c. Pyrophosphate. 0.1 c. c. N/1 NaOH. 0.1 c. c. H_2O.	2 c. c. Pyrophosphate. 0.1 c. c. N/1 NaOH.	2 c. c. Pyrophosphate. 0.1 c. c. N/1 NaOH.

Side arm

0.3 c. c. cysteine HCl (6 mg.). 0.1 c. c. N/1 HCl.	6 mg. cysteine HCl. 0.1 c. c. GSH ash.	6 mg. cysteine HCl. 0.1 c. c. GSH ash. 0.1 c. c. Cu=1×10^{-4} mg.	6 mg. cysteine HCl. 0.1 c. c. control ash.

The reaction of the pyrophosphate was so adjusted that after the addition of the acid cysteine solution from the side arm the pH was 7.67. The pH determinations were made with the glass electrode. A fifth vessel with pyrophosphate was used as a thermobarometer. The vessels were shaken in a water bath until equilibrium was reached. The solutions from the side arms were then emptied into the main vessels and after a few minutes of shaking the cocks were closed and readings were begun.

The results are shown in Chart 11. From these results the copper content of this preparation of glutathione was estimated to be 0.013 mg. of copper per gram of glutathione. It was also found that the ash of 10 mg. of glutathione caused a considerable increase in oxygen consumption of the 15 mg. of glutathione to which it was added, in pyrophosphate buffer. (Chart 12.) These experiments indicate that the samples of crystalline glutathione made by us by the Hopkins procedure contain traces of copper.

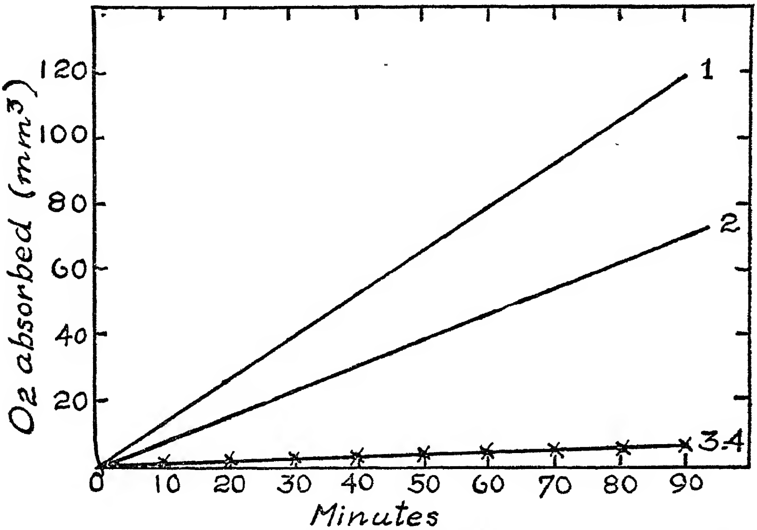


CHART 11.—The estimation of copper in glutathione B (Hopkins) by the cysteine method of Warburg, in M/5 pyrophosphate, pH 7.67. Curve 1: 6 mg. cysteine HCl+ash of 10 mg. glutathione +0.0001 mg. Cu. Curve 2: Cysteine HCl+ash of 10 mg. glutathione. Curve 3: Cysteine HCl+ control ash (empty quartz vessel). Curve 4: Cysteine HCl alone. *Conclusion:* 10 mg. glutathione contains 0.00013 mg. Cu

In order to determine the reliability of the cysteine method for copper analysis the effects were determined of various concentrations of copper on the velocity of cysteine oxidation in M/5 pyrophosphate buffer. Warburg found that at pH 7.6, when concentrations of copper up to 2×10^{-4} mg. were employed (these are the limitations within which we have worked), there was a direct proportionality between the amount of copper present and the rate of oxidation. Elvehjem (1930) found that by employing M/100 pyrophosphate in M/15 phosphate buffer at pH 8.0 accurate determinations could be made up to 4×10^{-4} mg. copper.

In Chart 13B is shown the effect of various copper concentrations on the rate of oxidation of 6 mg. of cysteine (hydrochloride) in M/5 pyrophosphate. In Chart 13A the results of three such experiments are plotted in terms of relative increases in rate with increasing copper concentrations. The increase resulting from the lowest amount of copper was taken as 100 per cent. It is seen that up to 2×10^{-4} mg. of copper there is a roughly direct proportionality, but when greater concentrations of copper are used the rate of oxidation increases out of proportion to the copper concentration. This is interesting in view of the experiments of Elliott (1930), who studied the effect of

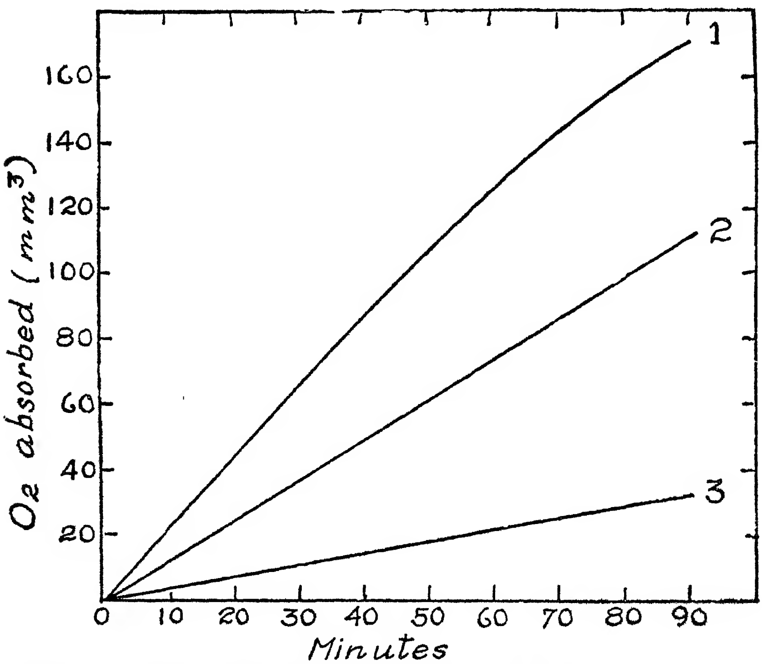


CHART 12.—The effect of glutathione ash on the oxidation of 15 mg. glutathione B (Hopkins) in pyrophosphate pH 7.68. Curve 1: Glutathione+ash of 10 mg. glutathione+0.0002 mg. Cu. Curve 2: Glutathione+ash of 10 mg. glutathione. Curve 3: Glutathione alone

concentration of copper on cysteine oxidation in unbuffered solutions at pH 7.3. He began with 6.4×10^{-4} mg. of copper in 3 c. c. of solution containing 8 mg. of cysteine. As the concentration of copper was increased above this amount there was a relative decrease in catalytic activity instead of an increase, as we have found with the lower concentrations of copper in pyrophosphate. These relationships are apparently dependent upon the ratio of cysteine concentration to that of copper, for in an experiment where the concentration of cysteine was varied, Elliott obtained results similar to ours when the ratio of

cysteine to copper approached a multiple ($\times 3$) of the ratios which we employed.

Glutathione behaves differently from cysteine in regard to the velocity of oxygen uptake in the presence of varying amounts of copper. Under conditions identical to those used with cysteine, the

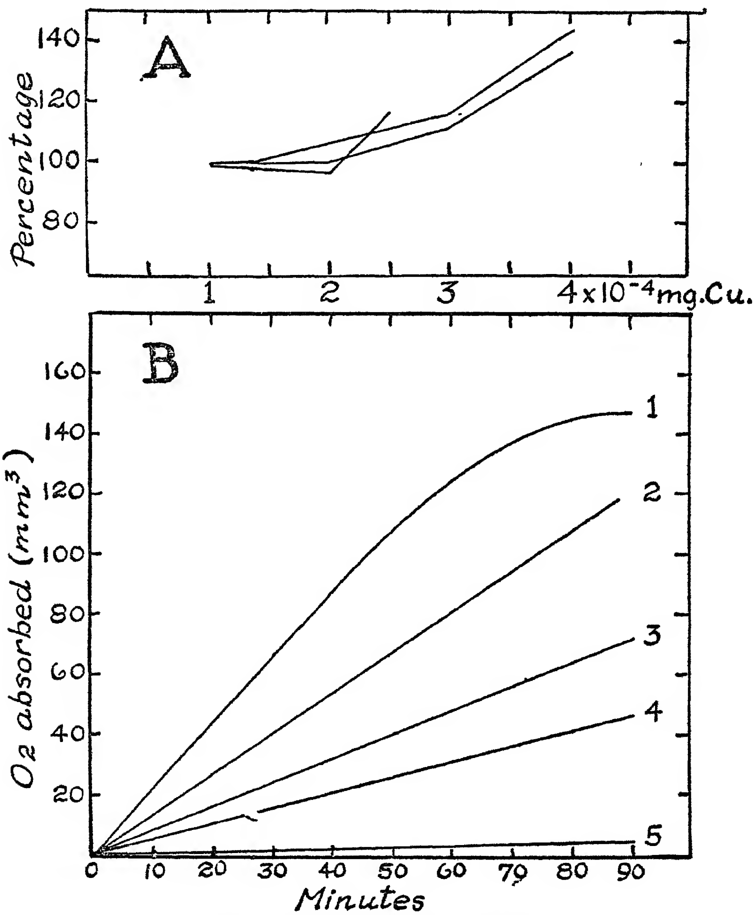


CHART 13.—B. The relation of concentration of Cu to velocity of oxidation of cysteine. Six mg. cysteine HCl in M/5 pyrophosphate pH 7.67. Curve 1: 4×10^{-4} mg. Cu. Curve 2: 3×10^{-4} mg. Cu. Curve 3: 2×10^{-4} mg. Cu. Curve 4: 1.4×10^{-4} mg. Cu. Curve 5: Cysteine alone. In part A of the chart the results of three such experiments are plotted in terms of relative effect, the increase in O_2 uptake of smallest amount of copper being taken as 100 per cent

proportionality between copper concentration and oxygen uptake is, as with cysteine, approximately linear below copper concentrations of 2×10^{-4} mg.; but with larger amounts of copper there is a falling off of catalytic activity instead of an increase as with cysteine. These

observations are shown in Chart 14B, and the results of three such experiments, plotted in terms of the relative effect of various copper concentrations, are shown in Chart 14A.

DISCUSSION

In agreement with Meldrum and Dixon (1930) we find that crystalline glutathione, dissolved in phosphate buffer of pH 7.6 absorbs

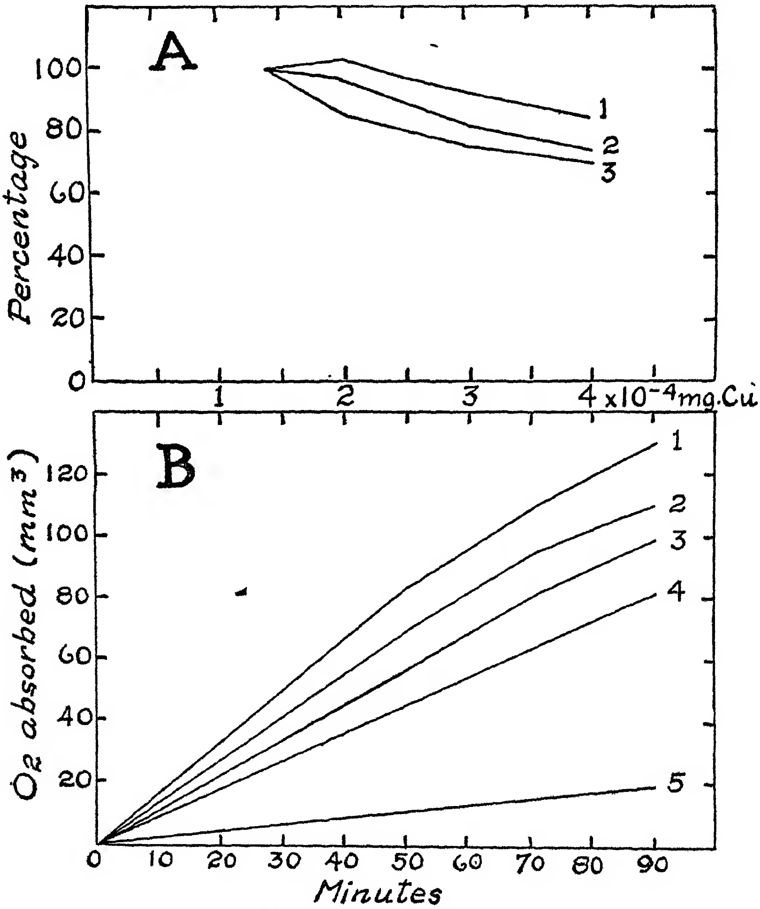


CHART 14.—B. The relation of concentration of copper to the velocity of oxidation of glutathione. Fifteen mg. glutathione B (Hopkins) in pyrophosphate, pH 7.6. Curve 1: 4×10^{-4} mg. Cu. Curve 2: 3×10^{-4} mg. Cu. Curve 3: 2×10^{-4} mg. Cu. Curve 4: 1.4×10^{-4} mg. Cu. Curve 5: Glutathione alone. In part A of the chart the results of three such experiments are plotted in terms of relative effect

oxygen at a slow rate. Working at 20° C. they state that 5 mg. of glutathione consumes about 30 mm.[3] per hour. In our experiments, carried out at 37.6° C. in phosphate of pH 7.6, we find even a lower oxygen uptake. We also confirm the observations of Meldrum and

Dixon, that treatment of glutathione solutions with purified kaolin causes a decrease in the rate of oxygen consumption. This may be due to the removal of traces of catalytic metals by the kaolin.

We also confirm the observations of Meldrum and Dixon that the addition of various iron salts to glutathione solutions does not increase the rate of oxidation. But we are unable to confirm the accelerating action on oxygen uptake of the addition of iron to kaolin-treated crystalline glutathione solutions.

Our observations on the action of hematin are also in harmony with Meldrum and Dixon's findings and indicate a low order of activity of this substance in the oxidation of glutathione.

The principal and important discrepancy between our findings and those of Meldrum and Dixon concerns the action of copper salts. They state that copper is catalytically *inactive*. We find that copper in very low concentrations exerts a powerful catalytic effect on solutions of crystalline glutathione dissolved in phosphate or pyrophosphate buffer or Locke's solution, within the physiological pH range. This catalytic action is also present in glutathione solutions which have been treated with kaolin.

In view of this discrepancy between our results and those of Meldrum and Dixon, it is necessary to consider the possibility that this is due to differences in the glutathione employed. We have attempted to control this source of variation by employing several samples of glutathione prepared both by the method of Hopkins and that of Kendall and by employing a preparation made in Kendall's laboratory, all of which gave similar results. It is of interest also that none of our preparations, when tested with the Sullivan reaction as recently described by Sullivan and Hess (1931), gave any evidence of the presence of cysteine or other impurities reacting with the naphthoquinone reagent.

We furthermore present evidence indicating that crystalline glutathione, prepared by strictly following the method of Hopkins, contains sufficient traces of copper to explain the so-called autoxidation on the basis of a copper catalysis.

Finally, we have shown that the addition of small amounts of *pure* cysteine does not accelerate the rate of oxidation of crystalline glutathione. In a subsequent paper we shall present further evidence concerning the specificity of copper as a catalyst and a description of methods for the preparation of glutathione which shows an exceedingly small oxygen uptake.

In conclusion we can state that these purely chemical results may possibly have a biological bearing. Glutathione and copper both occur normally in various tissues in small amounts, but their physiological function is still more or less obscure. The work of Hart, Steenbock, Waddell and Elvehjem (1928) has shown that traces of

copper in the diet, in contrast to other heavy metals, are highly effective in the prevention and cure of nutritional anemia of rats. Glutathione seems to be concerned in some phase of the complex biological oxidation-reduction process, and also appears to play the rôle of activator of certain proteolytic enzymes (Waldschmidt-Leitz (1930) and Grassmann, Schoenebeck and Eibeler (1931)).

Our present observations suggest perhaps that there is a physiological relationship between glutathione and copper. The ability of blood serum and of egg white rapidly to oxidize crystalline glutathione (Rosenthal and Voegtlin, 1931) can be explained on a basis of their copper content. On the other hand, we found that some tissues with a high copper content, as liver, are able under physiological conditions to keep added glutathione in the reduced state. Some years ago Voegtlin, Johnson, and Dyer (1925) showed that albino rats survive a minimum lethal dose of sodium cupri tartrate if the animals receive a preceding intravenous dose of reduced glutathione in the ratio of 10 moles of glutathione to 1 atom of copper. We have recently confirmed these results by using highly purified crystalline glutathione. The anemia and loss of body weight produced by sublethal doses of copper can also be prevented by glutathione.

CONCLUSIONS

1. Crystalline glutathione, prepared according to the method of Hopkins or that of Kendall, is susceptible to oxidation catalysis by traces of copper salts.

2. Iron salts, under the same conditions, do not exert a catalytic action on the oxidation of crystalline glutathione.

3. The rate of oxidation of glutathione is not accelerated by the addition of *small* amounts of hematin Larger amounts of hematin increase the rate of oxidation, but this effect is of a low order of magnitude when compared with that of copper. After repeated recrystallization, hemin still contains minute amounts of copper, but the action of hematin, made from this hemin, does not appear to be due to this copper, but rather to the intact structure of hematin. This is shown by complete ashing of the hemin and adding the dissolved ash to the glutathione solution. This practically abolishes the action. Furthermore, protoporphyrin, prepared from the same lot of hemin, when added to glutathione is practically inactive. The acceleration of the oxidation of glutathione and of cysteine by large amounts of hematin occurs in pyrophosphate buffer solutions. In this respect also hematin differs in behavior from iron salts.

4. The so-called autoxidation of crystalline glutathione is dependent upon the presence of traces of a heavy metal in the crystalline product. The minute amount of ash obtained by complete combustion of crystalline glutathione, when analyzed for copper by the Warburg

method, evidently contains sufficient copper to account for the relatively low rate of oxygen uptake of solutions of crystalline glutathione.

5. We were unable to demonstrate that the oxidation of crystalline glutathione is dependent on the presence of small amounts of cysteine.

REFERENCES

Elvehjem, C. A.: Biochem. Jour., 1930, xxiv, 415.

——— and Lindow, C. W.: Jour. Biol. Chem., 1929, lxxxi, 435.

Fischer, H., and Pützer, B.: Zeitsch. f. physiol. Chem., 1926, cliv, 39.

Grassmann, W., Schoenebeck, O. V., and Eibeler, H.: Zeitsch. f. physiol. Chem., 1931, cxciv, 124.

Harrison, D. C.: Biochem. Jour., 1924, xviii, 1009.

Hart, E. B., Steenbock, H., Waddell, J., and Elvehjem, C. A.: Jour. Biol. Chem., 1928, lxxvii, 797.

Hopkins, F. G.: Jour. Biol. Chem., 1929, lxxxiv, 269.

Kendall, E. C., McKenzie, B. F., and Mason, H. L.: Jour. Biol. Chem., 1929, lxxxiv, 657.

Michaelis, L.: Jour. Biol. Chem., 1929, lxxxiv, 777.

Meldrum, N. U., and Dixon, M.: Biochem. Jour., 1930, xxiv, 472.

Rosenthal, S. M., and Voegtlin, Carl: Pub. Health Rep., 1931, xlvi, 521.

Sullivan, M. X., and Hess, W. C.: Public Health Reports, 1931, xlvi, 390.

Voegtlin, Carl, Johnson, J. M., and Dyer, Helen, A: Proc. Nat. Acad. Sci., 1925, xi, 344.

Waldschmidt-Leitz: Naturwissenschaften, 1930, xviii, 644.

Warburg, O., and Sakuma, S.: Arch. f. d. ges. physiol., 1923, cc, 203.

Warburg, O.: Biochem. Zeitsch., 1927, clxxxvii, 255.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for July, 1931

The accompanying table, taken from the Statistical Bulletin for August, 1931, issued by the Metropolitan Life Insurance Co., presents the mortality record of the industrial insurance department of the company for July as compared with that for the preceding month and for the corresponding month of last year. It also gives the cumulative rates for the period January–July of the years 1930 and 1931. The rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada. In recent years the general death rate in this more or less selected group of persons has averaged about 72 per cent of the rate for the registration area of the United States.

In spite of the economic depression, health conditions have been excellent so far this year in this group of industrial policyholders, which consists of persons most likely to be affected by economic disturbances.

The Bulletin states:

July was the fourth successive month this year to register a lower death rate than that for the corresponding month of 1930. This low mortality since the

beginning of the second quarter has affected the cumulative death rate for the year so favorably that at the end of July it stands only 1.1 per cent above the figure for the corresponding part of last year. At the end of the first quarter the cumulative mortality rate was 5.1 per cent above that for the like period of 1930.

Except for the influenza outbreak of last winter, the present high prevalente of acute poliomyelitis, a considerable increase in deaths from diabetes, and an indicated rise of unusual proportions in the cancer mortality rate, there are no real bad spots in the 1931 health record to date. The mortality has been low for all of the principal epidemic diseases of childhood, particularly diphtheria; the tuberculosis death rate is 7 per cent below the previous minimum, registered only last year; the rates for diarrheal complaints and puerperal conditions are running lower than ever before. The small increases that appear for heart diseases and cerebral hemorrhage reflect largely the effect of last winter's influenza outbreak, which undoubtedly hastened the deaths of many persons suffering from chronic diseases.

As for deaths due to violence, the rates for suicide and homicide have increased slightly, and that for automobile accidents appreciably. For all accidents combined, however, a slight decline is in evidence, as compared with the January–July period of 1930.

Death rates (annual basis) per 100,000 for principal causes of death

[Industrial insurance department, Metropolitan Life Insurance Co.]

Cause of death	Rate per 100,000 lives exposed *				
	July, 1931	June, 1931	July, 1930	Cumulative January to July	
				1931	1930
Total, all causes	831.7	835.1	854.6	934.8	924.4
Typhoid fever	1.7	1.9	2.6	1.3	1.5
Measles	3.2	5.5	2.3	4.7	4.4
Scarlet fever	2.6	3.7	1.8	3.8	3.2
Whooping cough	2.7	3.2	5.0	3.5	4.7
Diphtheria	3.0	3 3	4.3	4.4	6.8
Influenza	4.9	8.9	4.3	20.9	18.9
Tuberculosis (all forms)	74.4	77.9	86.1	80.6	86.6
Tuberculosis of respiratory system	64.9	67.9	75.4	71.2	75.2
Cancer	82.9	81.2	80.3	83.1	77.5
Diabetes mellitus	16.6	19.4	16.9	21.8	19.4
Cerebral hemorrhage	59.6	59.1	61.0	64.6	62.7
Organic diseases of heart	134.7	139.3	135.5	158.6	155.2
Pneumonia (all forms)	37.0	53.2	30.7	94.7	93.7
Other respiratory diseases	9.1	8.9	10.4	11.8	12.4
Diarrhea and enteritis	16.4	10.8	23.2	11.1	14.2
Bright's disease (chronic nephritis)	60.8	65.8	67.8	70.2	71.5
Puerperal state	10.2	11.4	11.5	11.7	12.9
Suicides	9.6	10.8	9.4	9.8	9.7
Homicides	7.0	6.2	7.9	6.7	6.5
Other external causes (excluding suicides and homocides)	89.7	65.3	81.1	60.0	61.4
Traumatism by automobiles	25.1	22.9	22.5	20.1	19.0
All other causes	205.5	199.3	203.5	202.5	201.5

*All figures in this table include insured infants under one year of age. The rates for 1931 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

ARKANSAS LAW RELATING TO ANTIFREEZE MIXTURES

The legislature of Arkansas, at its session in 1931, passed an act regulating the sale of antifreeze mixtures containing in excess of 10 per cent of methanol. This law (act 165, approved March 25, 1931)

contains provisions as to the coloring, labeling, etc., of antifreeze mixtures, and also requires that certain records be made and kept of the retail sale of the mixtures. The full text of the statute follows:

SECTION 1. *Antifreeze mixtures containing over 10 per cent of methanol; requirements governing sale, etc.*—On and after the passage of this act it shall be unlawful for any person to sell, offer for sale, give away, or transfer to another person any article commonly known as antifreeze containing in excess of 10 per cent of methanol, unless the following provisions are complied with:

1. It shall be distinctively colored, so that by its appearance it can not be confused with potable alcohol.

2. It shall contain an emetic or such warning substance or substances as the United States Public Health Service may recommend.

3. All containers of quantities less than tank car lots shall be plainly marked on the outside with a stencil or label securely attached, which bears the word "methanol" in red ink in letters at least one-half inch in height, and below or adjacent to such word "methanol" shall also be in red ink the skull and crossbones symbol and the words:

POISON, METHANOL IS A VIOLENT POISON, IT CAN NOT BE MADE NONPOISONOUS. IF TAKEN INTERNALLY MAY CAUSE BLINDNESS AND DEATH

SEC. 2. *Making and keeping of record of retail sales.*—It shall be unlawful for any person conducting a store, garage, filling station, or other place selling antifreeze mixtures or compounds at retail, or any of the employees of such persons, to sell, offer for sale, give away, or transfer to another person any antifreeze mixture or compound containing in excess of 10 per cent of methanol or any [m]ethyl alcohol, in quantities less than 50-gallon drum lots unless before delivery is made there be recorded in book kept for the purpose:

Date of sale.
Name and address of person to whom sold.
Article and quantity delivered.
Purpose for which it is to be used.
Name of person making sale.

Such record to be kept for inspection by the State board of health and its duly authorized representatives for a period of three years from date of last record made of sale: *Provided, however,* That no such record shall be necessary when such antifreeze mixture or compound shall be placed in an automobile radiator by the vendor at the time and place of sale, and when it is apparent that such mixture or compound is intended for antifreeze purposes: *And, provided further,* An automobile radiator shall not be construed to mean a container under the provisions of this act.

SEC. 3. *Act not applicable to certain sales of methanol.*—Nothing contained in this act shall be construed to apply to sales of methanol by or to pharmacists, or to sales by the manufacturer or dealer of methanol direct to other manufacturers for manufacturing purposes.

SEC. 4. *Definitions.*—The word "person" as used in this act shall be construed to include natural persons, partnerships, associations, and corporations.

The word "methanol" as used in this act shall be construed to mean and include the products commonly known as methanol, and methyl alcohol, wood alcohol, wood naphtha, methyl hydroxide, and methyl hydrate.

SEC. 5. *Penalty.*—Any person violating any of the provisions of this act shall be guilty of a misdemeanor and upon conviction shall be fined in any sum not less than $25 nor more than $200.

SEC. 6. *Repeal; emergency; act immediately effective.*—All laws and parts of laws in conflict herewith are hereby repealed, and whereas the manufacture of the compound, the sale of which is herein regulated, is about to begin in this State, and whereas it is immediately necessary that the public be informed of its nature, an emergency is hereby declared and this act shall be in full force and effect from and after its passage and approval.

DEATHS DURING WEEK ENDED AUGUST 29, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended August 29, 1931; and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended August 29, 1931	Corresponding week, 1930
Policies in force	74, 972, 336	75, 702, 504
Number of death claims	12, 281	12, 295
Death claims per 1,000 policies in force, annual rate	8. 5	8. 5
Death claims per 1,000 policies, first 35 weeks of year, annual rate	10. 0	9. 9

Deaths [1] from all causes in certain large cities of the United States during the week ended August 29, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Aug. 29, 1931				Corresponding week, 1930		Death rate [2] for the first 35 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	6, 629	9. 7	623	[4] 49	10. 3	638	12. 3	12. 3
Akron	28	5. 7	1	10	6. 3	5	8. 0	7. 9
Albany [5]	34	13. 7	5	99	16. 7	5	14. 0	15. 2
Atlanta	66	12. 4	6	61	12. 5	7	15. 5	16. 1
White	39		3	48		4		
Colored	27	(6)	3	86	(6)	3	(6)	(6)
Baltimore [5]	182	11. 7	23	78	10. 7	10	14. 8	14. 3
White	141		14	61		9		
Colored	41	(6)	9	141	(6)	1	(6)	(6)
Birmingham	55	10. 6	5	50	8. 8	5	14. 0	14. 0
White	30		3	51		2		
Colored	25	(6)	2	49	(6)	3	(6)	(6)
Boston	184	12 2	22	63	11. 3	21	14. 5	14. 4
Bridgeport	25	8. 9	3	50	8. 9	3	11. 4	11. 4
Buffalo	113	10. 1	19	78	10. 9	9	13. 5	13. 2
Cambridge	18	8. 2	2	40	7. 3	2	12. 4	12. 1
Camden	44	19. 3	8	139	14. 9	5	14 9	13. 9
Canton	19	9. 3	1	23	11. 9	3	10. 5	10. 4
Chicago [5]	540	8. 1	50	44	9. 1	50	11. 1	10. 6
Cincinnati	121	13. 8	10	60	12. 7	3	16. 4	15. 8
Cleveland	155	8. 9	14	41	10. 6	12	11. 4	11. 4
Columbus	62	10. 9	5	49	15. 9	4	14. 0	16. 2
Dallas	36	6. 9	4		8. 3	5	11. 6	11. 9
White	27		3			4		
Colored	9	(6)	1		(6)	1	(6)	(6)
Dayton	38	9. 6	4	56	11. 1	5	12. 1	10. 5
Denver	66	11. 8	4	39	18. 4	13	14. 2	15. 0
Des Moines	17	6. 1	0	0	11. 7	3	11. 3	12. 1
Detroit	188	5. 9	20	32	8. 1	31	8. 5	9. 6
Duluth	23	11. 8	0	0	10. 3	4	11. 2	11. 3

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended August 29, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Aug. 29, 1931				Corresponding week, 1930		Death rate for the first 35 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
El Paso	23	11.4	3	--------	15.7	8	16.3	18.1
Erie	40	17.7	2	37	9.9	2	11.0	11.5
Fall River [5] [7]	18	8.1	6	136	10.4	1	11.7	12.4
Flint	20	6.4	5	64	7.9	3	7.3	9.4
Fort Worth	28	8.7	3	--------	4.4	2	11.1	11.2
White	25	--------	3	--------		2		
Colored	3	(6)	0	--------	(6)	0	(6)	(6)
Grand Rapids	15	4.6	2	30	9.2	4	9.2	10.6
Houston	43	7.2	3	--------	10.9	10	11.3	12.4
White	27	--------	1	--------	--------	8	--------	--------
Colored	16	(6)	2	--------	(6)	2	(6)	(6)
Indianapolis	89	12.5	4	33	13.8	6	14.2	15.0
White	74	--------	3	28	--------	5	--------	--------
Colored	15	(6)	1	67	(6)	1	(6)	(6)
Jersey City	53	8.7	4	36	9.5	4	11.9	11.6
Kansas City, Kans.	14	5.9	2	41	14.1	2	13.0	11.5
White	11	--------	2	49	--------	0	--------	--------
Colored	3	(6)	0	0	(6)	2	(6)	(6)
Kansas City, Mo.	76	9.7	6	46	10.5	6	13.6	13.5
Knoxville	21	10.0	5	107	14.2	7	12.7	14.3
White	19	--------	5	119	--------	6	--------	--------
Colored	2	(6)	0	0	(6)	1	(6)	(6)
Long Beach	27	9.2	0	0	9.4	1	10.0	10.1
Los Angeles	255	10.1	15	44	11.3	19	10.9	11.2
Louisville	89	15.1	12	103	14.9	5	14.7	14.1
White	74	--------	8	79	--------	5	--------	--------
Colored	15	(6)	4	265	(6)	0	(6)	(6)
Lowell [7]	28	14.5	1	25	8.3	0	12.8	13.9
Lynn	11	5.6	0	0	6.1	1	9.9	10.8
Memphis	71	14.3	9	95	16.8	11	16.7	17.9
White	33	--------	3	50	--------	5	--------	--------
Colored	38	(6)	6	174	(6)	6	(6)	(6)
Miami	25	11.6	0	0	5.6	0	12.2	11.3
White	18	--------	0	0	--------	0	--------	--------
Colored	7	(6)	0	0	(6)	0	(6)	(6)
Milwaukee	76	6.7	14	61	8.5	10	9.6	9.8
Minneapolis	85	9.4	9	58	10.4	11	11.6	10.7
Nashville	41	13.7	5	74	14.9	8	17.2	17.0
White	26	--------	4	80	--------	6	--------	--------
Colored	15	(6)	1	59	(6)	2	(6)	(6)
New Bedford [7]	20	9.3	2	53	7.4	0	12.5	11.2
New Haven	37	11.9	6	114	8.7	1	12.6	13.3
New Orleans	138	15.4	15	82	14.2	11	17.3	17.8
White	83	--------	9	74	--------	8	--------	--------
Colored	55	(6)	6	98	(6)	3	(6)	(6)
New York	1,177	8.7	115	48	9.0	122	11.6	11.2
Bronx Borough	162	6.3	1	2	7.0	17	8.5	8.1
Brooklyn Borough	423	8.4	63	67	8.1	47	10.7	10.2
Manhattan Borough	425	12.2	40	68	13.2	51	17.6	16.6
Queens Borough	118	5.3	5	14	6.0	3	7.5	7.3
Richmond Borough	49	15.6	6	108	10.8	4	14.1	14.6
Newark, N. J.	81	9.5	6	31	9.3	4	12.0	12.4
Oakland	60	10.7	2	26	10.6	3	10.7	11.1
Oklahoma City	35	9.3	7	97	8.6	4	11.2	10.7
Omaha	58	14.0	6	67	9.7	1	14.2	14.0
Paterson	26	9.8	4	69	13.2	6	13.8	12.6
Peoria	17	8.2	1	26	10.4	1	12.9	12.8
Philadelphia	360	9.5	39	57	9.5	32	13.6	12.9
Pittsburgh	137	10.6	10	35	13.5	25	15.0	14.1
Portland, Oreg.	64	10.9	1	12	11.4	4	11.8	12.5
Providence	50	10.2	6	55	10.3	8	13.1	13.4
Richmond	51	14.4	6	87	10.8	4	16.1	15.3
White	28	--------	1	22	--------	3	--------	--------
Colored	23	(6)	5	217	(6)	1	(6)	(6)
Rochester	68	10.7	3	27	10.0	5	12.2	11.8
St. Louis	167	10.5	4	13	11.7	7	15.8	14.7
St. Paul	36	6.8	5	52	8.4	1	11.1	10.2
Salt Lake City [5]	32	11.7	2	30	12.6	3	12.4	12.8
San Antonio	56	12.2	7	--------	14.1	16	15.0	17.5
San Diego	38	12.7	4	81	15.7	4	13.9	14.6

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended August 29, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930.—Continued

City	Week ended Aug. 29, 1931				Corresponding week, 1930		Death rate for the first 35 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
San Francisco	156	12.5	2	13	9.7	4	13.3	13.1
Schenectady	16	8.7	2	59	13.1	2	10.8	11.5
Seattle	89	12.5	6	57	9.8	1	11.6	11.1
Somerville	12	5.9	1	37	9.0	1	9.3	10.1
South Bend	12	5.8	1	25	6.0	1	8.2	9.0
Spokane	20	9.0	3	78	8.6	0	12.4	12.4
Springfield, Mass	29	9.9	1	15	11.4	2	12.1	12.5
Syracuse	40	9.8	2	24	8.4	1	11.9	11.9
Tacoma	22	10.6	0	0	13.2	0	12.1	12.9
Toledo	55	9.7	4	37	11.8	7	12.3	12.9
Trenton	28	11.8	2	35	15.2	3	16.9	17.1
Utica	21	10.7	1	26	12.3	2	14.4	15.2
Washington, D. C	145	15.3	16	89	13.9	11	16.2	15.5
White	84	------	12	98	------	9	------	------
Colored	61	([6])	4	69	([6])	2	([6])	([6])
Waterbury	20	10.3	2	60	5.2	2	9.8	10.2
Wilmington, Del.[7]	17	8.3	4	86	12.7	2	14.3	14.7
Worcester	34	9.0	1	14	12.5	7	12.5	13.2
Yonkers	21	7.9	6	157	6.9	1	8.9	8.2
Youngstown	22	6.6	2	28	6.7	3	10.5	10.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 77 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended September 5, 1931, and September 6, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 5, 1931, and September 6, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930
New England States:								
Maine	1				2		1	0
New Hampshire		2		2			0	0
Vermont							0	0
Massachusetts [1]	38	30	1	2	26	24	2	1
Rhode Island	1	4			12		0	0
Connecticut	6	5	2	1	5		0	3
Middle Atlantic States:								
New York	60	57	[2] 4	[2] 3	80	73	6	11
New Jersey	17	41		3	13	15	1	1
Pennsylvania	71	50			59	48	6	11
East North Central States:								
Ohio	25	27	1	7	18	15	1	5
Indiana	11	16	8	3	4	1	2	1
Illinois	54	57	11	15	20	12	4	2
Michigan	17	25		1	13	35	1	9
Wisconsin	12	6	13	25	17	14	1	2
West North Central States:								
Minnesota	7	12		1	6		5	1
Iowa	4	1			1		0	0
Missouri	20	23		1	5	14	1	2
North Dakota	1	1					0	0
South Dakota	3	6			1	1	0	0
Nebraska	4	1			1	1	0	1
Kansas	10	14	1	1	4	7	3	1
South Atlantic States:								
Delaware	1	2			1	1	0	0
Maryland [1 3]	11	12	3	2	8		1	0
District of Columbia	2	9		1	1	9	0	0
Virginia								
West Virginia	10	11	11		10	3	0	0

[1] Typhus fever, 1931, 9 cases; 1 case in Massachusetts; 2 cases in Maryland; 4 cases in Georgia; and 2 cases in Alabama.
[2] New York City only.
[3] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 5, 1931, and September 6, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930
South Atlantic States—Continued.								
North Carolina	81	95		3	10	2	2	1
South Carolina	23	40	134	216	10		0	0
Georgia [1]	13	21	5	13		10	0	0
Florida	3	6			3	1	0	1
East South Central States:								
Kentucky	42						1	4
Tennessee	46	23	8	3	4	2	2	1
Alabama [1]	19	23	1	4	5	7	1	2
Mississippi	63	15					1	1
West South Central States:								
Arkansas	16	7		1	2		0	0
Louisiana	31	21	8	3	1	2	2	0
Oklahoma [4]	32	13	19	4	2	1	0	1
Texas	34	26		8	1	8	2	1
Mountain States:								
Montana					8	6	3	1
Idaho						1	0	0
Wyoming	1	1			2		0	0
Colorado	10	9			2	4	0	1
New Mexico	1	1				3	0	2
Arizona	2	10			2		2	1
Utah [3]	1	1	6	4	2	2	1	2
Pacific States:								
Washington	1	15			9	27	2	0
Oregon	1	1	7	7	4	25	0	0
California	31	30	20	13	57	40	2	2

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930
New England States:								
Maine	5	10	5	2	0	0	5	4
New Hampshire	2	2	0	2	0	0	0	0
Vermont	6	0	0	1	1	0	0	0
Massachusetts [1]	184	13	99	40	0	0	8	8
Rhode Island	14	1	11	4	0	0	3	2
Connecticut	162	1	12	3	0	0	2	2
Middle Atlantic States:								
New York	554	47	76	56	1	1	47	32
New Jersey	84	1	40	20	0	0	8	16
Pennsylvania	20	9	86	80	0	0	56	98
East North Central States:								
Ohio	6	55	69	81	5	12	59	65
Indiana	4	7	24	11	4	32	16	16
Illinois	42	19	68	64	9	19	40	56
Michigan	107	6	73	54	4	12	20	8
Wisconsin	69	9	9	20	2	3	7	8
West North Central States:								
Minnesota	50	11	9	22	0	1	0	4
Iowa	6	10	10	8	3	6	1	11
Missouri	3	10	14	27	1	5	15	16
North Dakota	2	1	2	0	4	0	8	2
South Dakota	2	5	9	3	0	9	3	6
Nebraska	5	7	6	9	1	8	4	5
Kansas	1	84	8	15	0	3	8	19

[1] Typhus fever, 1931, 9 cases; 1 case in Massachusetts; 2 cases in Maryland; 4 cases in Georgia; and 2 cases in Alabama.
[3] Week ended Friday.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 5, 1931, and September 6, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930	Week ended Sept. 5, 1931	Week ended Sept. 6, 1930
South Atlantic States:								
Delaware	0	1	2	4	0	0	4	7
Maryland [1] [3]	5	2	14	17	0	0	47	48
District of Columbia	0	1	2	4	0	0	1	2
Virginia	1	------	------	------	3	------	------	------
West Virginia	3	2	11	17	2	5	46	61
North Carolina	5	9	55	78	0	0	74	68
South Carolina	1	4	5	17	0	0	57	74
Georgia [1]	0	0	6	23	0	0	43	40
Florida	0	0	5	2	0	0	1	2
East South Central States:								
Kentucky	1	0	43	36	2	3	51	68
Tennessee	0	3	25	33	0	2	69	90
Alabama [1]	4	3	34	21	0	1	32	25
Mississippi	1	2	17	4	5	7	21	32
West South Central States:								
Arkansas	1	1	5	22	0	1	18	42
Louisiana	2	6	11	18	1	0	39	36
Oklahoma [4]	0	9	12	16	1	1	29	46
Texas	1	2	19	17	0	6	58	15
Mountain States:								
Montana	2	1	22	10	5	7	0	4
Idaho	0	1	3	2	1	0	0	0
Wyoming	1	3	4	3	0	0	1	0
Colorado	0	4	3	3	1	0	7	0
New Mexico	0	1	0	4	0	1	3	7
Arizona	1	0	2	7	0	1	5	5
Utah [3]	0	0	1	2	0	0	4	1
Pacific States:								
Washington	4	6	11	20	15	11	4	2
Oregon	1	0	5	12	6	7	11	5
California	8	53	61	32	3	11	15	14

[1] Typhus fever, 1931, 9 cases; 1 case in Massachusetts; 2 cases in Maryland; 4 cases in Georgia; and 2 cases in Alabama.
[3] Week ended Friday.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May, 1931										
Nevada	1	------	1	------	88	------	0	1	0	------
July, 1931										
South Carolina	------	41	255	1,466	172	652	8	8	1	333
August, 1931										
Arizona	3	4	4	1	3	1	1	3	1	18
Georgia	1	61	29	239	55	59	13	76	0	315
Iowa	2	15	------	------	8	------	25	36	32	17
Missouri	13	77	8	71	16	1	18	65	11	106
Nebraska	2	11	------	------	13	------	1	27	10	21
Wyoming	4	1	------	------	8	------	1	3	0	1

May, 1931	Cases
Nevada:	
Chicken pox	22
Mumps	4
Rocky Mountain spotted or tick fever	6

July, 1931	Cases
South Carolina:	
Chicken pox	56
Diarrhea	1,666
German measles	17
Hookworm disease	85
Lethargic encephalitis	1
Mumps	53
Ophthalmia neonatorum	8
Paratyphoid fever	20
Rabies in animals	6
Rocky Mountain spotted or tick fever	2
Whooping cough	210

August, 1931	Cases
Chicken pox:	
Georgia	11
Iowa	14
Missouri	9
Nebraska	11
Wyoming	1
Dengue:	
Georgia	4
Dysentery:	
Arizona	5
Georgia	26
Missouri	2
German measles:	
Iowa	1
Lethargic encephalitis:	
Georgia	1
Mumps:	
Arizona	1
Georgia	25
Iowa	14
Missouri	35
Nebraska	83
Wyoming	1
Paratyphoid fever:	
Georgia	5
Rabies in animals:	
Missouri	11
Rocky Mountain spotted or tick fever:	
Arizona	1
Septic sore throat:	
Georgia	36
Missouri	16
Nebraska	1
Trachoma:	
Arizona	4
Tularaemia:	
Missouri	1
Typhus fever:	
Georgia	21
Undulant fever:	
Georgia	2
Iowa	4
Missouri	20
Whooping cough:	
Arizona	12
Georgia	48
Iowa	62
Missouri	498
Nebraska	74
Wyoming	21

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of May, 1931, by departments of health of certain States to other State health departments

Disease	California	Connecticut	Illinois	Kansas	Massachusetts	Minnesota	New York	Washington
Gonorrhea						1		
Meningitis						1	1	
Scarlet fever		2			1		1	
Smallpox						1		
Syphilis				8		1		
Tuberculosis	1		23			32		
Typhoid fever	1					1		
Whooping cough								1

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 32,975,000. The estimated population of the 88 cities reporting deaths is more than 31,430,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended August 29, 1931, and August 30, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	695	631	
95 cities	196	241	361
Measles:			
45 States	545	445	
95 cities	140	123	
Meningococcus meningitis:			
46 States	65	87	
95 cities	21	39	
Poliomyelitis:			
46 States	1,319	344	
Scarlet fever:			
46 States	935	650	
95 cities	258	258	231
Smallpox:			
46 States	137	122	
95 cities	6	10	6
Typhoid fever:			
46 States	961	916	
95 cities	140	152	159
Deaths reported			
Influenza and pneumonia:			
88 cities	305	326	
Smallpox:			
88 cities	0	0	

City reports for week ended August 29, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during *nonepidemic years.*

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	0	---	0	0	1	1
New Hampshire:								
Concord	0	0	0	---	0	0	0	0
Nashua	0	0	0	---	0	0	0	0
Vermont:								
Barre	0	0	0	---	0	0	0	0
Massachusetts:								
Boston	6	13	14	---	0	6	3	14
Fall River	1	0	1	---	0	2	1	0
Springfield	0	1	0	---	0	1	1	0
Worcester	1	2	0	---	0	0	7	0
Rhode Island:								
Pawtucket	0	0	0	---	0	0	0	0
Providence	0	2	0	---	0	15	0	2
Connecticut:								
Bridgeport	0	2	2	---	0	2	1	2
Hartford	---	2	---	---	---	---	---	---
New Haven	5	1	0	---	0	0	2	0
MIDDLE ATLANTIC								
New York:								
Buffalo	1	7	3	---	0	2	2	5
New York	7	76	31	4	2	18	10	82
Rochester	2	2	1	---	0	3	1	6
Syracuse	2	1	1	---	0	3	0	1
New Jersey:								
Camden	0	1	0	---	1	0	0	2
Newark	4	6	0	1	0	1	3	9
Trenton	0	1	0	---	0	0	0	0
Pennsylvania:								
Philadelphia	2	25	4	1	0	1	4	16
Pittsburgh	1	9	1	---	1	1	3	14
Reading	0	0	0	---	0	1	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	3	0	---	0	0	0	5
Cleveland	1	16	2	3	0	7	12	9
Columbus	0	2	0	1	0	2	2	0
Toledo	0	3	2	---	0	2	0	2
Indiana:								
Fort Wayne	0	1	2	---	0	0	0	0
Indianapolis	0	2	1	---	0	1	7	6
South Bend	0	0	0	---	0	0	0	1
Terre Haute	---	0	---	---	---	---	---	---
Illinois:								
Chicago	2	46	34	1	2	14	6	11
Springfield	0	0	4	---	0	0	1	1
Michigan:								
Detroit	2	22	10	---	0	1	2	5
Flint	1	1	0	---	0	0	2	1
Grand Rapids	0	1	0	---	0	1	0	0

City reports for week ended August 29, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—contd.								
Wisconsin:								
Kenosha	0	1	0		0	1	1	1
Madison	1	0	1			0	3	
Milwaukee	15	5	1		0	8	7	1
Racine	0	0	0		0	2	6	0
Superior	0	0	0		0	0	2	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0		0	0	0	0
Minneapolis	2	0	0		0	2	5	6
St. Paul		4						
Iowa:								
Des Moines	0	1	1			0	0	
Sioux City	0	0	3			0	2	
Waterloo	0	0	0			0	0	
Missouri:								
Kansas City	0	1	2		0	1	4	6
St. Joseph	0	0	2		0	0	0	1
St. Louis	1	14	7			1	1	1
North Dakota:								
Fargo	0	0	0		0	0	0	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	0	3	4		0	0	0	2
Kansas:								
Topeka	0	0	1		1	0	6	0
Wichita	0	0	0		0	0	0	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	0	1	0
Maryland:								
Baltimore	3	11	8	1	0	0	1	14
Cumberland	0	0	0		0	0	0	0
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	1	6	6	2	2	1	0	7
Virginia:								
Lynchburg	0	0	1		0	0	0	0
Richmond	0	6	2		0	0	0	1
Roanoke	0	2	1		0	1	0	1
West Virginia:								
Charleston	2	0	0		0	0	0	0
Wheeling	0	1	1		0	0	0	2
North Carolina:								
Raleigh	0	1	0		0	0	0	0
Wilmington	0	0	1		0	0	0	0
Winston-Salem	0	1	7		0	0	4	2
South Carolina:								
Charleston	0	0	0	11	0	0	0	0
Columbia	0	0	4		0	0	0	2
Greenville	0	0	0		0	0	0	0
Georgia:								
Atlanta	0	4	1		0	0	0	4
Brunswick	0	0	0		0	0	0	0
Savannah	0	1	0	1	0	0	0	1
Florida:								
Miami	0	1	0		0	0	0	0
Tampa	0	1	0		1	0	0	1

City reports for week ended August 29, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	----------	0	0	0	1
Tennessee:								
Memphis	0	1	4	----------	0	0	1	2
Nashville	0	1	3	----------	0	0	0	1
Alabama:								
Birmingham	1	2	0	----------	2	1	2	3
Mobile	0	0	2	----------	0	0	0	2
Montgomery	0	1	0	----------	----------	0	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	2	----------	----------	2	0	----------
Little Rock	0	0	0	----------	0	0	0	3
Louisiana:								
New Orleans	8	6	0	----------	0	4	0	11
Shreveport	0	0	1	----------	0	0	0	0
Oklahoma:								
Muskogee	0	0	1	----------	0	0	0	0
Texas:								
Dallas	0	4	2	----------	0	0	0	0
Fort Worth	0	0	3	----------	0	0	0	1
Galveston	0	0	0	----------	0	0	0	0
Houston	0	3	2	----------	0	0	0	0
San Antonio	0	2	3	----------	0	1	0	3
MOUNTAIN								
Montana:								
Billings	0	0	0	----------	0	2	0	0
Great Falls	0	1	0	----------	0	1	0	0
Helena	0	0	0	----------	0	0	0	0
Missoula	0	0	0	----------	0	0	0	0
Idaho:								
Boise	0	0	0	----------	0	0	0	1
Colorado:								
Denver	2	7	2	----------	0	3	1	1
Pueblo	0	1	0	----------	0	0	0	4
New Mexico:								
Albuquerque	0	0	0	----------	0	0	0	1
Arizona:								
Phoenix	0	0	0	----------	0	0	0	0
Utah:								
Salt Lake City	4	1	0	----------	0	0	0	1
Nevada:								
Reno	0	0	0	----------	0	0	0	0
PACIFIC								
Washington:								
Seattle	6	2	0	----------	----------	1	6	----------
Spokane	1	1	0	----------	----------	0	0	----------
Tacoma	1	1	0	----------	0	0	0	0
Oregon:								
Salem	3	0	1	----------	0	0	1	0
California:								
Los Angeles	2	18	11	8	0	5	5	8
Sacramento	0	1	0	----------	0	0	0	2
San Francisco	0	6	1	1	1	21	1	2

City reports for week ended August 29, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	0	0	0	0	0	1	1	0	0	1	28
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	8
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	3
Massachusetts:											
Boston	14	8	0	0	0	8	3	2	0	29	184
Fall River	1	1	0	0	0	1	0	0	0	0	18
Springfield	1	1	0	0	0	0	1	0	0	4	28
Worcester	2	3	0	0	0	0	1	0	0	6	34
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	1	0	0	14
Providence	2	3	0	0	0	3	0	6	0	7	50
Connecticut:											
Bridgeport	2	3	0	0	0	2	1	0	0	3	25
Hartford	1	-------	0	-------	-------	-------	0	-------	-------	-------	-------
New Haven	1	0	0	0	0	0	1	0	0	7	37
MIDDLE ATLANTIC											
New York:											
Buffalo	5	8	0	0	0	4	1	1	0	21	109
New York	21	19	0	0	0	89	38	38	2	167	1,177
Rochester	2	8	0	0	0	0	0	0	0	9	64
Syracuse	1	4	0	0	0	1	0	0	0	10	40
New Jersey:											
Camden	0	1	0	0	0	3	1	0	0	0	44
Newark	3	3	0	0	0	8	1	1	0	111	88
Trenton	1	1	0	0	0	2	1	2	0	0	28
Pennsylvania:											
Philadelphia	14	20	1	0	0	35	8	2	0	101	360
Pittsburgh	7	4	0	0	0	12	2	1	0	22	137
Reading	0	0	0	0	0	2	1	0	0	4	22
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	3	11	0	0	0	8	3	1	0	8	121
Cleveland	9	10	0	0	0	15	4	1	0	46	155
Columbus	2	4	0	0	0	5	1	0	0	10	62
Toledo	2	2	0	0	0	3	2	4	1	20	55
Indiana:											
Fort Wayne	0	0	0	0	0	1	2	0	0	1	24
Indianapolis	2	1	0	0	0	5	1	0	0	11	-------
South Bend	1	0	0	0	0	0	0	0	0	3	13
Terre Haute	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Illinois:											
Chicago	24	23	0	0	0	42	5	2	1	148	540
Springfield	0	0	0	0	0	0	0	1	0	0	19
Michigan:											
Detroit	20	15	0	0	0	17	4	11	3	116	188
Flint	3	2	0	0	0	1	0	1	0	1	20
Grand Rapids	3	1	0	0	0	0	1	0	0	8	15
Wisconsin:											
Kenosha	0	1	0	0	0	0	0	0	0	3	7
Madison	1	0	0	0	-------	-------	0	0	-------	2	-------
Milwaukee	5	0	0	0	0	4	0	0	0	55	76
Racine	1	1	0	0	0	0	0	0	0	5	15
Superior	1	1	0	0	0	0	0	0	0	3	6
WEST NORTH CENTRAL											
Minnesota:											
Duluth	3	2	0	0	0	3	0	0	0	2	23
Minneapolis	11	5	0	1	0	2	1	3	0	3	85
St. Paul	5	-------	1	-------	-------	-------	0	-------	-------	-------	-------
Iowa:											
Des Moines	2	2	0	9	-------	-------	0	0	-------	0	17
Sioux City	0	0	0	0	-------	-------	0	0	-------	5	-------
Waterloo	0	0	0	0	-------	-------	0	0	-------	1	-------

City reports for week ended August 29, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd.											
Missouri:											
Kansas City	2	1	0	0	0	3	3	1	0	10	76
St. Joseph	0	0	0	0	0	0	0	0	0	0	21
St. Louis	9	5	0	0	0	12	7	2	1	45	167
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	3	--------
Grand Forks	0	0	0	0	--------	--------	0	0	--------	2	--------
South Dakota:											
Sioux Falls	0	0	0	0	--------	--------	0	0	--------	0	6
Nebraska:											
Omaha	1	2	0	1	0	1	0	0	0	0	58
Kansas:											
Topeka	1	1	0	0	0	0	1	1	0	2	14
Wichita	1	0	0	0	0	0	0	0	0	0	27
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	0	0	0	0	1	0	0	0	2	17
Maryland:											
Baltimore	5	0	0	0	0	15	8	4	3	102	18
Cumberland	0	0	0	0	0	2	1	0	0	0	11
Frederick	0	0	0	0	0	0	0	0	0	0	5
Dist. of Columbia:											
Washington	4	3	0	0	0	12	3	2	1	16	145
Virginia:											
Lynchburg	0	1	0	0	0	0	2	1	0	0	11
Richmond	2	5	0	0	0	1	2	0	0	0	48
Roanoke	1	0	0	0	0	0	0	0	1	0	19
West Virginia:											
Charleston	0	1	0	0	0	2	2	1	0	5	23
Wheeling	0	0	0	0	0	0	1	2	0	3	14
North Carolina:											
Raleigh	1	0	0	0	0	3	1	0	0	1	16
Wilmington	0	2	0	0	0	0	0	0	1	6	8
Winston-Salem	1	2	0	0	0	4	1	2	0	16	22
South Carolina:											
Charleston	0	0	0	0	0	2	3	2	0	0	21
Columbia	0	0	0	0	0	0	1	0	0	0	19
Greenville	1	0	0	0	0	0	0	0	0	0	--------
Georgia:											
Atlanta	4	1	0	2	0	4	4	3	2	1	66
Brunswick	0	0	0	0	0	0	0	0	0	0	1
Savannah	0	0	0	0	0	1	1	2	0	0	20
Florida:											
Miami	0	0	0	0	0	0	1	0	0	0	25
Tampa	0	0	0		0	0	0	0	0	0	18
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0	0	2	1	0	0	0	12
Tennessee:											
Memphis	1	8	0	0	0	11	9	1	0	12	71
Nashville	0	2	0	0	0	2	6	5	0	3	41
Alabama:											
Birmingham	3	5	0	0	0	4	5	2	0	1	55
Mobile	0	2	0	0	0	1	0	0	0	0	19
Montgomery	0	0	0	0	--------	--------	0	0	--------	2	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	1	0	0	--------	--------	0	0	--------	0	--------
Little Rock	0	0	0	0	0	4	1	0	1	0	9
Louisiana:											
New Orleans	2	6	0	0	0	12	4	[1] 21	2	3	138
Shreveport	0	0	0	0	0	4	0	0	5	8	30
Oklahoma:											
Muskogee	0	0	0	0	0	0	1	1	0	0	--------

[1] 13 cases nonresidents.

City reports for week ended August 29, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL—contd.											
Texas:											
Dallas	2	5	1	0	0	0	2	6	0	4	36
Fort Worth	1	1	0	0	0	2	1	0	1	0	28
Galveston	0	0	0	0	0	3	0	0	0	0	16
Houston	1	7	1	0	0	1	1	0	0	0	43
San Antonio	1	0	0	0	0	7	1	2	1	0	56
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	1	6
Great Falls	0	5	0	0	0	0	0	0	0	2	9
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	0	0	0	0	0	0	0	0	0	0	2
Idaho:											
Boise	0	1	0	0	0	0	0	0	0	0	6
Colorado:											
Denver	2	12	0	0	0	5	1	0	1	14	60
Pueblo	0	0	0	0	0	0	0	1	1	0	11
New Mexico:											
Albuquerque	0	0	0	0	0	2	1	3	0	2	8
Arizona:											
Phoenix	0	0	0	0	0	1	0	1	0	0	--------
Utah:											
Salt Lake City	2	1	0	0	0	1	1	0	0	2	32
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	8
PACIFIC											
Washington:											
Seattle	3	4	1	1	--------	--------	1	2	--------	16	--------
Spokane	2	0	0	1	--------	--------	0	1	--------	8	--------
Tacoma	1	0	1	0	0	0	0	0	0	4	22
Oregon:											
Salem	0	0	0	0	0	0	0	0	0	0	--------
California:											
Los Angeles	7	12	1	0	0	23	0	0	0	30	255
Sacramento	1	0	0	0	0	3	1	1	0	1	25
San Francisco	5	4	0	0	0	8	1	2	0	12	153

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	2	0	0	0	0	0	3	43	9
Fall River	1	1	0	0	0	0	0	3	1
Springfield	0	0	0	0	0	0	0	9	0
Worcester	0	0	0	0	0	0	1	8	1
Rhode Island:									
Pawtucket	0	0	0	0	0	0	0	1	0
Providence	0	0	0	0	0	0	1	16	1
Connecticut:									
Bridgeport	0	0	0	0	0	0	1	4	0
New Haven	0	0	0	0	0	0	0	18	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	0	0	2	1	0
New York	2	1	3	1	0	0	10	432	44
Rochester	0	1	0	0	0	0	0	5	1
New Jersey:									
Newark	0	0	0	0	0	0	1	8	0
Trenton	0	0	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	3	1	0	0	0	0	1	6	2
Pittsburgh	0	0	2	0	0	0	0	1	0

City reports for week ended August 29, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	0	0	0	0	0	0	1	1
Cleveland	1	1	0	0	0	0	2	1	0
Toledo	0	1	0	0	0	0	0	0	0
Indiana:									
Fort Wayne	1	1	0	0	0	0	0	0	0
Indianapolis	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago	3	2	0	0	0	0	3	6	2
Michigan:									
Detroit	0	0	2	0	0	0	1	15	0
Grand Rapids	0	0	0	0	0	0	0	3	0
Wisconsin:									
Madison	0	0	0	0	0	0	0	4	0
Milwaukee	1	1	0	0	0	0	1	10	0
Superior	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	1	10	1
Minneapolis	0	0	0	1	0	0	0	6	2
Missouri:									
Kansas City	0	1	0	0	0	0	0	0	0
St. Louis	3	2	0	0	0	0	1	3	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	0	0	0	1	1	0
District of Columbia:									
Washington	0	0	2	0	0	0	1	0	0
West Virginia:									
Wheeling	0	0	0	0	0	0	0	1	0
North Carolina:									
Wilmington	0	0	0	0	0	0	0	1	0
Winston-Salem	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston [1]	0	0	0	0	4	0	0	0	0
Georgia:									
Atlanta	0	0	0	0	0	0	0	3	2
Savannah [1]	0	0	0	0	2	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	0	0	1	0	0	0	0	0
Alabama:									
Birmingham	0	0	0	0	1	0	0	0	0
Mobile [1]	0	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	0	0	0	0	1	1	1	0	0
Texas:									
Fort Worth	0	0	0	0	0	0	0	1	0
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	0	1	1
Missoula	0	0	0	0	0	0	1	1	0
PACIFIC									
Washington:									
Tacoma	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	1	0	0	0	1	0	2	1	1
San Francisco	1	1	0	0	0	0	1	0	0

[1] Typhus fever, 3 cases: 1 case at Charleston, S. C.; 1 case at Savannah, Ga.; and 1 case at Mobile, Ala.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended August 29, 1931, compared with those for a like period ended August 30, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, July 26 to Aug. 29, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug. 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930
98 cities	35	38	31	37	[2] 32	31	[3] 30	33	[4] 31	38
New England	53	36	65	34	41	44	67	44	[5] 44	53
Middle Atlantic	31	34	26	32	26	22	19	27	18	29
East North Central	38	48	31	48	[2] 30	36	[2] 28	40	[2] 33	45
West North Central	17	35	29	29	36	27	[6] 32	25	[6] 40	27
South Atlantic	32	40	26	18	43	38	24	40	63	64
East South Central	12	6	41	18	17	30	35	12	52	12
West South Central	61	35	64	49	47	49	68	63	34	66
Mountain	35	35	26	18	78	18	41	44	17	70
Pacific	47	45	18	57	31	30	35	22	24	16

MEASLES CASE RATES

98 cities	93	67	60	49	[2] 39	32	[3] 29	28	[4] 22	20
New England	132	106	135	99	79	65	63	65	[5] 68	22
Middle Atlantic	84	87	57	61	32	39	25	31	13	22
East North Central	153	33	87	27	[2] 61	19	[2] 37	21	[2] 23	7
West North Central	27	43	15	52	11	31	[6] 15	19	[6] 9	27
South Atlantic	47	60	34	24	10	24	20	20	4	32
East South Central	47	36	12	18	23	18	23	6	6	12
West South Central	10	10	3	10	0	7	7	0	24	10
Mountain	209	159	70	115	61	44	70	26	52	35
Pacific	57	105	43	63	49	43	22	40	53	30

SCARLET FEVER CASE RATES

98 cities	47	38	46	31	[2] 33	30	[3] 44	32	[4] 41	41
New England	82	60	43	46	53	56	99	51	[5] 49	56
Middle Atlantic	52	21	51	20	31	17	38	25	30	26
East North Central	52	50	60	45	[2] 48	39	[2] 57	35	[2] 43	47
West North Central	31	48	19	27	23	29	[6] 21	35	[6] 34	43
South Atlantic	41	44	38	20	22	28	36	30	30	72
East South Central	35	6	41	12	41	48	17	30	70	102
West South Central	20	52	41	35	17	31	27	35	64	14
Mountain	61	62	61	70	26	44	44	88	165	88
Pacific	16	34	22	38	10	32	31	28	39	26

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] Terre Haute, Ind., not included.
[3] Terre Haute, Ind., and St. Paul, Minn., not included.
[4] Hartford, Conn., Terre Haute, Ind., and St. Paul, Minn., not included.
[5] Hartford, Conn., not included.
[6] St. Paul, Minn., not included.

Summary of weekly reports from cities, July 26 to Aug. 29, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Aug. 1, 1931	Aug. 2, 1930	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug. 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930
98 cities	2	4	3	3	[2] 1	3	[3] 1	2	[4] 1	2
New England	0	0	0	0	0	0	0	0	[5] 0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	1	2	2	6	[2] 1	3	[2] 0	0	[2] 0	0
West North Central	11	12	13	6	8	6	[6] 6	8	[6] 4	8
South Atlantic	2	4	2	2	2	0	4	2	4	0
East South Central	6	0	0	0	0	6	0	0	0	0
West South Central	3	14	0	7	0	3	0	7	0	3
Mountain	0	0	9	0	9	0	0	0	0	0
Pacific	8	22	14	4	2	12	4	10	4	10

TYPHOID FEVER CASE RATES

98 cities	27	18	22	17	[2] 21	20	[3] 21	19	[4] 22	24
New England	12	7	14	5	26	5	5	17	[5] 23	12
Middle Atlantic	13	5	16	10	14	14	14	13	20	20
East North Central	11	12	10	11	[2] 7	10	[2] 11	9	[2] 10	10
West North Central	31	23	19	19	13	29	[6] 21	21	[6] 15	19
South Atlantic	77	52	53	66	77	44	55	60	38	88
East South Central	64	108	29	60	70	132	70	78	47	42
West South Central	169	42	95	14	45	42	91	24	98	66
Mountain	17	26	44	35	44	26	9	26	9	44
Pacific	4	16	14	10	12	12	8	6	12	8

INFLUENZA DEATH RATES

91 cities	3	1	2	3	[2] 3	1	[3] 2	3	[4] 2	4
New England	2	0	2	0	0	0	2	0	[5] 0	0
Middle Atlantic	4	0	3	2	3	2	2	3	2	3
East North Central	2	1	1	1	[2] 2	0	[2] 2	1	[2] 1	4
West North Central	0	0	0	3	3	3	[6] 3	0	[6] 3	3
South Atlantic	6	6	0	10	4	0	6	8	6	8
East South Central	13	0	13	0	6	0	0	0	13	6
West South Central	0	0	3	0	7	0	0	4	0	7
Mountain	0	0	0	18	17	0	0	9	0	0
Pacific	7	2	5	5	2	0	7	7	2	2

PNEUMONIA DEATH RATES

91 cities	48	52	43	52	[2] 45	53	[3] 48	45	[4] 48	52
New England	41	41	34	46	29	41	36	56	[5] 49	51
Middle Atlantic	59	59	52	56	56	68	56	53	60	57
East North Central	30	43	35	47	[2] 37	27	[2] 32	27	[2] 26	50
West North Central	47	48	56	45	44	27	[6] 38	36	[6] 56	39
South Atlantic	65	66	79	72	57	74	63	52	69	60
East South Central	50	52	63	45	50	52	57	65	57	45
West South Central	59	75	62	53	52	85	59	57	59	36
Mountain	44	62	44	70	44	123	44	53	61	53
Pacific	36	35	38	35	14	40	53	40	29	45

[2] Terre Haute, Ind., not included.
[3] Terre Haute, Ind., and St. Paul, Minn., not included.
[4] Hartford, Conn., Terre Haute, Ind., and St. Paul, Minn., not included.
[5] Hartford, Conn., not included.
[6] St. Paul, Minn., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended August 22, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended August 22, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia			1		1
New Brunswick					2
Quebec			26		26
Ontario	4		10	4	22
Manitoba			1		4
Saskatchewan		14		10	1
Alberta [1]					
British Columbia			2		3
Total	4	14	40	14	59

[1] No case of any disease included in the table was reported during the week.

Quebec—Communicable diseases—Week ended August 22, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 22, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	4	Poliomyelitis	26
Diphtheria	15	Scarlet fever	26
Erysipelas	1	Tuberculosis	46
German measles	5	Typhoid fever	25
Measles	16	Whooping cough	18

CUBA

Habana—Communicable diseases—Four weeks ended August 15, 1931.—During the four weeks ended August 15, 1931, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	1	1	Scarlet fever	3	
Diphtheria	7		Tuberculosis	39	8
Malaria	7	1	Typhoid fever	26	10
Measles	63				

Provinces—Communicable diseases—Three weeks ended July 4, 1931.—During the three weeks ended July 4, 1931, cases of certain communicable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer			1	1			2
Chicken pox		10	2			29	41
Diphtheria		12	1	1	1	1	16
Malaria		2			2	42	46
Measles		66	6	10	2		84
Paratyphoid fever		1	1	1		2	5
Scarlet fever		2		1			3
Typhoid fever	2	33	8	27	6	14	90

GREAT BRITAIN

Scotland—Vital statistics—Quarter ended June 30, 1931.—The Registrar General of Scotland has published the following statistics for the second quarter of the year 1931:

Population (provisional)	4,842,554
Births	24,122
Birth rate per 1,000 population	20.0
Deaths	15,918
Death rate per 1,000 population	13.2
Marriages	8,158
Deaths under 1 year	1,867
Deaths under 1 year per 1,000 births	77
Deaths from—	
Bronchitis	795
Broncho-pneumonia	502
Cerebrospinal fever	85
Diabetes	158
Diphtheria	82
Dysentery	4
Erysipelas	40
Heart disease	2,286
Deaths from—Continued.	
Influenza	310
Lethargic encephalitis	31
Lobar pneumonia	402
Measles	84
Nephritis (acute)	55
Nephritis (chronic)	368
Pneumonia (not otherwise defined)	229
Poliomyelitis	7
Puerperal sepsis	44
Scarlet fever	43
Syphilis	25
Tetanus	2
Tuberculosis	1,175
Typhoid fever	5
Whooping cough	308

JAMAICA

Communicable diseases—Four weeks ended August 15, 1931.—During the four weeks ended August 15, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Puerperal fever		2
Chicken pox	1	4	Scarlet fever		8
Dysentery		2	Tuberculosis	34	91
Leprosy		2	Typhoid fever	17	99

PANAMA CANAL ZONE

Communicable diseases—July, 1931.—During the month of July, 1931, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	7		Measles	40	
Diphtheria	5		Mumps	1	
Dysentery (amebic)	4	1	Pneumonia		35
Dysentery (bacillary)	1		Tuberculosis		25
Leprosy	1	1	Typhoid fever	1	
Malaria	327	5	Whooping cough	12	

YUGOSLAVIA

Communicable diseases—July, 1931.—During the month of July, 1931, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	119	8	Paratyphoid fever	11	1
Cerebrospinal meningitis	7	5	Puerperal fever	11	1
Diphtheria and croup	458	50	Scarlet fever	312	17
Dysentery	368	31	Tetanus	48	23
Erysipelas	131	7	Typhoid fever	289	37
Lethargic encephalitis	1		Typhus fever	3	
Measles	318	14			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases, D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	Sept. 5, 1931
Ceylon: Colombo	C	1		1	1								1	1	1			
	D			1	1								1	1	1			
China:																		
Canton	C		1	2			1											
	D			1														
Shanghai	C									1				1	5	1		
Swatow	C					3	1	6	7									
Tientsin	C			1		2	8											
	D			1			1											
India	C	8,968	11,462	13,604	3,932	4,657	4,687	4,725	4,737	5,002								
	D	4,550	5,767	7,270	2,146	2,656	2,704	2,831	2,677	2,848								
Bombay	C		2							1	11	11	9	18	6	11		
	D		1								6	10	4	9	7	5		
Calcutta	C	436	310	265	94	74	50	74	72	62	55	48	42	27	20	21		
	D	256	176	149	57	47	26	38	35	34	58	28	10	7	7	6		
Karikal	C	12	19	12														
	D	12	14	7														
Madras	C	20	26	52	3	6			2	2			1		2	3		
	D	10	13	17		4												
Moulmein	C										1							
	D										1							
Negapatam	D																1	
Rangoon	C			2		2		2		1	2	1		1	1			
	D			1		1		1			1			1	1			
Vizagapatam	C							1										
India (French):																		
Chandernagor	C	7	6	4		1	2		1	1	1	2	1	4	2			
	D	6	5	4		1	2			1			1	4	2			
Pondicherry	C	100	24	17	1	1	1			1	1	1	1		1			
	D	18	4	7	1	1	1			1	1	1	1		1			
India (Portuguese)	C							1		2								
	D									1								
Indo-China (see also table below):																		
Cochin-China—Rachgia	C												P					
Pnompenh	C		2		1					1	4			1		1		
	D	1	1	2	1					1	1			1				
Saigon and Cholon	C	5	27	104	18	16	14	13	8	3	3							
	D	5	22	76	9	14	9	9	3	2	2							

Iraq:																		
Abulkhasib	C																6	
	D																5	
Amara	C															2	22	35
	D															1	21	30
Amara Province	C																6	11
	D																5	4
Basra	C												3	9	263	272	148	
	D												2	8	140	137	76	
Basra Province	C															5	14	6
	D															2	10	3
Muntafiq Province	C																10	21
	D																8	20
Suqelshuyukh	C																2	
	D																2	
Persia: Rafsanjan [1]	C			36														
	D			14														
Philippine Islands: [2] Provinces—																		
Capiz	C	48	29	17	4													9
	D	41	24	15	4													5
Cebu	C													1	1	1		
	D													1	1	1		
Iloilo	C	7			8	7	5	6	24	3								
	D	4			6	5	6	4	22	3								
Masbate	C	21																
	D	9																
Negros, Occidental	C							2										
	D							1										
Pampanga	C			1														
Siam	C	10	16	14		1	3		1	1			1					
	D	2	4	5		1	1			1								
Ayudhaya District	C	1																
Bangkok	C	3	3					1	1			3				1		
	D	2	2	1				1				2						
Bismulok Province	C	8																
	D	2																
On vessel:																		
S. S. Arankola, at Rangoon from Calcutta	C			1														
S. S. City of Eastborne, at Calcutta from Cocanada	C				1													
S. S. Tairea, at Penang from Calcutta	C					1												
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C											1						
	D											1						
S. S. Kohistan, at Basra from Bushire, Persia	C											2						
S. S. Cathay, at Kobe, Japan, from Shanghai	C																4	
	D																1	

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			Aug. 1-10, 1931
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	
Indo-China (French) (see also table above):														
Cambodia [1]	C	125	79	58		44	40	83	96		72	82	87	12
Cochin-China [1]	C	29	105	62	1	52	75	71	69		66	30	47	39

[1] Reports incomplete.

PLAGUE

Place		Feb. 8-Mar. 7, 1931	Mar 8-Apr. 4, 1931	Apr. 5-May 2, 1931	May 3-30, 1931	Week ended—													
						June, 1931				July, 1931				August, 1931					Sept. 5, 1931
						6	13	20	27	4	11	18	25	1	8	15	22	29	
Algeria:																			
Algiers	C	1	1										2						
	D		1																
Bone	C					1													
Constantine, vicinity of	C	1																	
Philippeville	C										1				1	1			
	D										1				1				
Argentina:																			
Cordoba Province	C	2																	
Entre Rios Province—Diamante	C	2																	
Jujuy Province—Palpala	C	1																	
San Juan Province	C										P	P							
Santa Fe	C	2																	
Belgian Congo	C		2				1												
	D		2				1												
British East Africa (see also table below):																			
Tanganyika	C	22	8	18	46	4	7	5	1			6							
	D	4	1	21	30	2	4	1	3			6							

Uganda	C	15	19	35	138		91	106	101	95	132	98	93						
	D	15	19	32	126		87	100	99	94	129	96	90						
Ceylon: Colombo	C	11	8	4	3		1		1				1	4	1	1			
	D	13	7	3	3		1		1				1	4	1	1			
Plague-infected rats		3	4	1	5									1	3	4			
China: Amoy [1]	C				1														
	D				1														
Dutch East Indies:																			
Batavia and West Java	C	141	84	74	59	15	25	11	15	21	18	19	17						
	D	128	80	71	59	15	25	11	15	21	18	19	17						
East Java and Madura	C	1	4	1	1														
	D	1	4	1	1														
Java and Madura	D	376	277	243	176	41	58	48	45	59	55	52	66	38	53				
Egypt:																			
Alexandria	C	2	1					3	1	1	1	2	9	4	3	1	1		2
	D							3	1	1			4	1	2				1
Plague-infected rats		1																	
Assiout	C	41	13	32	18	4		5	2										
	D	11	6	17	7				1										
Beni-Suef	C			12	5														
	D			3	3														
Beheira	C													1		1			2
Cairo	C		1																
Dakahlia	C											1			2				
Deirout	C	16		3	10	3													
	D	4		1	4	1													
Gharbieh	C						1												
	D						1												
Girga	C		80	44	7					1									
	D		24	22	2														
Kena	C		5	3	1														
	D		2	1	1														
Manfalut	C	15	17																
	D	5	3																
Minieh	C		3	1	6	3				10		2							
	D		2		3	1				2		1	1						
Port Said	C						1	1	1	1	1	2	1	2					
	D				1			1	1	1									
Tanta	C															2			1
Hawaii Territory:																			
Hawaii—Hamakua—Plague-infected rats					1														
Maui Island—Kula District	C														1				
	D														1				
India	C	5,457	9,139	6,142	752	39	24	9	16	30	29								
	D	3,661	7,037	5,199	602	25	14	2	10	15	13								
Bassein	C	1		1	1					1			3		1		1		
	D	1		1	1					1			2		1		1		
Bombay	C	1	4	11	8					1									
	D	1	3	11	6														
Plague-infected rats		32	70	137	94	10	10	10	7	11	16	9	12	8	13	17	9		

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	Sept. 5, 1931
India—Continued.																			
Burma	C											7	9						
	D											5	5						
Calcutta	C			2															
	D			2															
Madras Presidency	C	74	23	3	2		1	5		1	2	8							
	D	46	21	2	1		1				1	1							
Moulmein	C											1						P	
	D											1							
Rangoon	C		1	1	2		1					2		1					
	D		1	1	2		1					1		1					
Plague-infected rats		8	7	4	7		3			1	2	2	1	1		1	1		
Indo-China (see also table below): Pnompenh	C	1				1		1											
	D	4	6	4		1		1											
Iraq:																			
Baghdad	C	3	8	23	23	10	6	1	6	1	1	1				1			1
	D	2	5	8	9	1	4	1	3	1		1							
Maudhan	C				2														
Madagascar (see also table below): Tamatave	C													1					
Nigeria: Lagos	C			5															
	D			5															
Plague-infected rats				6															
Peru (see table below).																			
Senegal (see table below).																			
Siam	C	18	31	1	2	1													
	D	14	7	1	2	1													
Bangkok	C	6	29																
	D	5	6																
Nagara Rajsima	C	7	1																
	D	6																	
Spain: Hospitalet—Barcelona Province	C																5	1	
	D																2		
Syria: Beirut	C	1									1		1						
Tripolitania	C	1																	
Tunisia: Tunis	C	14	10	16	16		8	2	1										
	D	7	4	8	3		1												

Union of South Africa:																			
Cape Province	C			3															
Orange Free State	C	1	6	2	2														
	D	1	1	2	2														

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
British East Africa (see also table above):							
Kenya	C	21	7	345	245	154	471
Indo-China (see also table above)	C		4	11		2	1
	D	2		2		2	1
Madagascar (see also table above):							
Ambositra Province	C	90	70	30	19	15	
	D	88	86	29	18	15	
Antisirabe Province	C	84	83	48	7	8	
	D	79	74	47	7	8	
Miarinarivo Province	C	31	19	6	2		
	D	29	19	6	2		
Moramanga Province	C	7	1		2		
	D	7	1		2		
Tananarive Province	C	145	90	41	18	2	
	D	139	81	40	18	1	
Peru	C	12	8	8	2	5	2
	D	6	2	1		1	
Senegal:							
Baol [1]	C				4		27
	D				3		13
Dakar [1]	C			2	63	64	95
	D			1	49	56	73
Louga [1]	C		14	1	5	4	3
	D		6		2	2	1
Rufisque [1]	C	2			1	2	34
Thies [1]	C					12	16
	D					3	7
Tivaouane [1]	C			4	19	3	3
	D				11	2	2

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15	22
Algeria:																	
Algiers	C	1	2	2	1		7	1				1					
Constantine	C		1		1					1							
Arabia: Aden	C	1															
Belgian Congo	C				47	27	15										
Belgium	C	1															
Bolivia.[1]																	
Brazil: Porto Alegre (alastrim)	C	7	49	53	19	2	3			9	10	9	13				
	D	1	1			1					1						
British East Africa: Tanganyika	C	91	8		13			1	6	37	83		29				
	D	13	3							7	5		5				
British South Africa:																	
Northern Rhodesia	C										21						
Southern Rhodesia	C						1				2						
Canada:																	
Alberta	C	1									1				1		
British Columbia	C	8										2	2			3	
Manitoba	C	1			4												
Winnipeg	C	1															
Nova Scotia	C		1														
Ontario	C	29	9	17	25		4	3	14	3	6	12	1		2	2	4
Kingston	C	1		5													
North Bay	C	1															
Ottawa	C	1						1									
Sault Ste. Marie	C	2		4	1												
Toronto	C		2	4	1			1									
Quebec	C									1							
Saskatchewan	C	63	58	46	48	7	16	18	13		13	10	19		10	6	10
Regina	C	1	2	2	2												
Canary Islands: Las Palmas	C		1														
Chile:																	
Antofagasta	C									1							
Chanaral	C				1												

China:																	
Amoy	C		1	2	6	1	2		1	1	1			1			
	D		1	1	3	1	1		1	1	1			1			
Canton	C	3	7	4	3			1		1			1				
Foochow	C	P	P	P	P		P						P				
Hankow	C	8	3	3	5	1	1	1	1	1							
Hong Kong	C	9	2	3	1												
	D	3	2	1	2												
Manchuria—																	
Harbin (see also table below)	C	4	2		3												
Kwantung—Dairen	C		2	2	2	1											
Nanking	C	P	P	P	P												
Shanghai—																	
Foreigners only	C	16	6	17	7	2	6	2	1	2	1						
Including natives	D	14	10	18	7	1	5	4	3	2	1	2	1				1
Swatow	D	13	26	2													
Tientsin	C				2						2	1					
Chosen (see table below).																	
Colombia: Cali	D				1												
Dutch East Indies:																	
Batavia and West Java	C	2	1		2												
	D	1															
East Java and Madura	C				1												
Finland	C			1													
France (see table below).																	
Great Britain:																	
England and Wales	C	745	795	744	570	83	94	62	48	56	45	50	36	26	25	19	21
Bradford	C	1	2	6	8			5									
Leeds	C		1	2	2												
London	C	98	147	227	183	25	50	31	16	21	9	12	12	6	12	4	4
London and Great Towns	C	683	544	558	403	57	84	49	38	53	33	34	32	22	20	17	10
	D	1		2		1				1							
Sheffield	C	32	10	7													
Stoke-on-Trent	C	1															
Greece (see table below).																	
Honduras:																	
Amapala	C	1															
Ocotepeque and Gracias districts	C	P															
Puerto Castilla	C	3															
Tegucigalpa	C			1													
Tela	C			1													
India	C	12,222	11,791	14,265	11,403	2,170	1,856	1,622	1,665	1,492	1,376						
	D	2,660	2,261	2,923	1,849	465	474	376	389	401	363						
Bassein	C				1												
Bombay	C	6	10	8	9		2	1	3		1	3	2	1		1	
	D	3	4	5	4		1	1	3		1	3	2	1			
Calcutta	C	251	382	287	89	14	19	14		11	6	2	2	4	4		5
	D	188	203	224	75	12	18	11		9	4	3	2		4		5
Cochin	C	59	46	39	3										1	1	
	D	3															
Karachi	C	4	4	6				2						1			
	D		2					1									

[1] An epidemic of smallpox was reported on May 13 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

SMALLPOX—Continued

[C indicates cases; D, deaths, P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931 6	13	20	27	July, 1931 4	11	18	25	August, 1931 1	8	15	22
India—Continued.																	
Madras	C	8	22	19	8			1	1		2			1			
	D	1	3	5	6				1								
Negapatam	C			3				2	1						2		
Rangoon	C	4	3	11	13		1	4	1	2		1		2		1	1
	D		1	1	5		1		1	1				1			1
Vizagapatam	C	8	2	10	6	2	1		3	2		2	1		3		2
	D	2	1	2	1		1		1	1					3		1
India (French):																	
Chandernagor	C	12	14	10	7			1		2		1					
	D	1	2	7	5					2							
Karikal	C	19	3	4	4	1	2		3	1	1	1	1	1		1	
	D	18		3	4	1	2		3	1	1	1	1	1		1	
Pondicherry Province	C	19	14	6	11	3	2	1	1	4	1		23	11			3
	D	19	14	9	11	3	2	1	1	4	1		23	11			3
India (Portuguese)	C	14	8	21	3												
	D	3	3	6	1												
Indo-China (see also table below):																	
Pnompenh	C		1		1	2											
	D				1												
Saigon and Cholon	C	4	8	1	2					1			2	1	1		
	D	1	8	1	1					1				1			
Iraq:																	
Baghdad	C	9		2	3		1										
	D				2												
Basra	C				2		1										
Mosul Liwa	C	5										1					1
	D	1															
Japan:																	
Kobe	C	2															
Nagoya	C											1					
Mexico (see also table below):																	
Jalisco (State)—Guadalajara	D		1	1	2		1			1	1		1			2	
Mexico City and surrounding territory	C	23	33	43	45	5	4	16		12	5	4	1	3	2		
	D	8	22	14	11	4	3	6		4	3	1		1	1		
Monterrey	C					1											
Torreon	C			1	1			1	2								
	D			2				1	1								
Vera Cruz	C	3	2	2	1												
Morocco (see table below).																	
Nigeria: Lagos	C		2														

Poland	C	1			3	1	1		1		17		1				
Portugal: Lisbon	C	40	52	56	67	5	17	12	14	15	12	18		17	12	8	
Rumania (see table below).																	
Siam	C	2		1	6			4	1		1						
	D				1				1			1					
Spain	C	P	P									7					
Straits Settlements	C	2	4	10	2										1		
	D	1	1	5	2												
Sudan (Anglo-Egyptian)	C	97	8	3	6		1										
	D	10	2		2												
Sudan (French) (see table below).																	
Syria (see table below).																	
Tunisia: Tunis	C		4														
Turkey (see table below).																	
Union of Socialist Soviet Republics (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P	P												
Orange Free State	C	P	P	P	P	P	P	P	P	P	P	P					
Transvaal	C	P	P					P		P		P					
Upper Volta	C	18	3	3	88	11		1		1		1					
	D		1		1												
On vessel:																	
S. S. Clan Mactoggart at Suez	C	2															
S. S. Clan Buchanan at Suez	C	2															
S. S. Rotterdam at Naples from Venice	C		1														
S. S. Clan McTavish at Manila from Chittagong	C			1													
S. S. Clan MacBrayne at Cochin	C	1															
S. S. Chilka at Rangoon	C	1															
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C			1													1
S. S. Talodi at Suakin	C				1												

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
China: Harbin (see also table above)	C			7		13	10
Chosen	C	1		11		1	4
	D	1		3			
France	C	4	16	15	6	54	
Greece	C		4			3	1
Mexico (see also table above)	D		3		1	1	2
Morocco	C		4	6	7	49	48
Rumania	C			1		1	

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931
Turkey	C	63	37	1		9	1
	D	7	6				
Union of Socialist Soviet Republics.							
Territories in Asia	C	194	532				
Ukraine	C	44	23				
Other territories in Europe	C	896	1,577				
Railroads, etc	C	43	77				

Place		January, 1931	February, 1931	March, 1931	April, 1931			May, 1931			June, 1931			July, 1931			Aug. 1-10, 1931
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	
Indo-China (see also table above)	C	141	168	264	100	42			17	41	30	16	1	1		7	29
Sudan (French)	C			4													
Syria: Beirut	C	1										1					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931				July, 1931				August, 1931				
						6	13	20	27	4	11	18	25	1	8	15	22	29
Algeria:																		
Algiers	C	2	3	3	7	4	4		1			2						
Bone	C															1	1	
Constantine Department	C	4	3	9	22	6	3	1	16	2		1		3				
Oran	C	1		1	2	2									1			
Australia, Western	C		1	1	1													
Bulgaria	C	5	9	30	16	11	10	6	3									
	D		2	3	4	2	1	1	2									
Chile: Valparaiso	D	1																
China:																		
Canton	C		1															
Manchuria—Harbin	C	5	3	8					26									
Shanghai	C				6							1						
Tientsin	C			2														
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C			1		1	1		1									
Beheira Province	C			4														
	D			2														
Eritrea: Asmara	C		1															
Great Britain: Scotland—																		
Fife County	C				1													
Greece (see table below).																		
Guatemala [1] (see table below).																		
Iraq: Baghdad	C	5	2		2													
	D	1			2													
Irish Free State:																		
Cork County—																		
Schull	C										1							
Skibbereen	C						1		1	1								

Kerry County—																		
Dingle	C				1													
Listowel	C								1									
Limerick County—																		
Limerick	C									2				1				
Michelstown	C									1								
Mayo County—																		
Belmullet	C				1													
Westport	C																1	
Japan	C								1									
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D												1					
Mexico City, including municipalities in Federal District	C	35	216	170	75	7	12	27		28	9	7	9	7	6			
	D	16	84	56	33	4	4	11		4	3	2	3	5	3			
San Luis Potosi	D	5	5	3	2						1	3					1	
Torreon	C												1					
	D												1					
Morocco	C	28	7	13	42		31	42	28	37	20	24	21		2	1		
	D	1		1	4		2	3	1	4	4							
Palestine	C	3	5	5	4		2	3		2				3	3	1	4	
Panama Canal Zone—Balboa	C				2													
Paraguay: Asuncion	D	1	1															
Poland	C	189	287	538	298		48	33	16	9	17	13	14	10	4	10	7	
	D	19	15	28	18		2	1	1	2	1	1	1	1		1		
Rumania	C	152	214	70	169	42	16	12	10	2	2	7						
	D	24	16	8	18	4	7	2		2	2	1						
Syria	C				4													
Tunisia:																		
Sbeit[illegible]inity of	C		20	12														
	D		7															
Sfax	C		2															
Tunis	C	18	14	13	29		64	[illegible]		1			1					
	D				3		4											
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below).																		
Union of South Africa:																		
Cape Province	C	P	1	P	P	P	P	P		P	P	P	P					
Municipality of East London	C		P					1										
Natal	C	P	1	P	P	P	P	P	P			P	P					
Orange Free State	C	P	P	P	P	P	P	P		P	P	12	P					
Transvaal	C	P	P	P	P	P	P	P		P	P	P	P					
Yugoslavia (see table below).																		

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reported an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Chosen: Seoul	C	124	3	4		6	
	D	8		1		1	
Czechoslovakia	C	26		5	11	2	
Greece	C	17	8	22	6	9	1
	D	2	1	3			
Guatemala	C					33	34
	D					15	5
Latvia	C	12					
Lithuania	C	3	99	34	10	13	
	D	1	3	5		2	
Mexico (see also table above)	D	83					
Turkey	C	18	15		3	3	2
Union of Socialist Soviet Republics:							
Territories in Asia	C	260					
Ukraine	C	419					
Other territories in Europe	C	1,373					
Railroads, etc.	C	158					
Yugoslavia	C	12	10	43	14	2	3
	D		1	5			

YELLOW FEVER

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15	22
Brazil:																	
Alagoas State	C															1	
	D															1	
Bahia State	C		1														
Ceara State	C		2	2	1	1											1
	D			2	1												1
Minas Geraes State	C		2	5	2												
	D		1	2	1												
Rio de Janeiro State	C	1	2		2												
	D	1	2														
Cambucy	C	2	1														
	D	1															
Padua	C	1															
Sergipe State	C						1										
British Cameroons: Mamfe	C				3	1		1									
	D				2												

Colombia—Magdalena Province—near Cienaga	C																
Gold Coast:																	
Akuse	C									2							
	D									1							
Dagomba District	C													2			
Kintampo	C											1					
	D											1					
Tamale	C										2						
	D										2						
Wale Wale	C													1			
	D													1			
Ivory Coast:																	
Bobo Dioulasso	C										1						
	D										1						
Grand Bassam	C													4			
Kong Circle	C											4					
Seguela	C																P
Nigeria: Abakaliki	C														1		
	D														1		
Senegal: Podor (Hinterland)	C																1
	D																1
Sudan (French)	C											4	P				
Upper Volta:																	
Banfora	C												2				
	D												1				
Ouagadougou	C																1

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ISSUED WEEKLY

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SEPTEMBER 25 - - 1931

SPECIAL ARTICLES

An Undulant Fever Outbreak Traced to Milk Supply

Governmental Functions in Public Health Education

Ship Inspection to Determine Mosquito Infestation

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UNITED STATES PUBLIC HEALTH SERVICE

Hugh S. Cumming, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. Williams, *Chief of Division*

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PUBLIC HEALTH REPORTS

VOL. 46 SEPTEMBER 25, 1931 NO. 39

OUTBREAK OF UNDULANT FEVER TRACED TO INFECTED MILK SUPPLY

By H. E. Hasseltine, *Senior Surgeon, United States Public Health Service,* and I. W. Knight, M. D., *District Health Officer, New Jersey State Department of Health*

The borough of Pitman, N. J., is situated in Gloucester County, 18 miles southeast of Philadelphia, Pa. The population of the borough is 5,387 (1930); a rural population of about 2,000 visits the village for commercial purposes, but the proximity of the larger communities of Camden, N. J., and Philadelphia tend to make Pitman less used as a market center for the farming population surrounding it.

The water supply of the town is obtained from artesian wells and is distributed through two systems, one supplying the older portion of the town, the other supplying the newer portion. Practically every individual in town uses water from one or both of these systems. The older distributing system serves a much smaller group than the newer system. The sanitary quality of the water supplied through both systems has always been satisfactory.

Sewage is conveyed by water-carriage system to two disposal plants, which discharge their effluent into two small streams.

The daily milk consumption of the town in November, 1930, was about 2,056 quarts, of which 1,540 quarts (75 per cent) were pasteurized, 510 quarts (25 per cent) were raw, and 6 quarts were certified. Milk was supplied by eight dealers, of whom four were producers of all or part of the milk that they sold. In Pitman, four dealers sold only raw milk, one sold only pasteurized milk, and three sold both raw and pasteurized milk. One of the latter group also sold certified milk.

Table 1 shows the relative amount of milk sold in Pitman by each dealer.

TABLE 1.—*Milk sold by different dealers in Pitman in November, 1930*

Dealer	Per cent of the town's total milk	Per cent of the town's raw milk	Per cent of the town's pasteurized milk	Per cent of the town's certified milk
A	17.02	68.62	(1)	
B	40.42	4.90	51.95	100
C	29.23	0.20	38.96	
D	5.84	15.69	2.60	
E	0.39	1.57		
F	1.46	5.88		
G	0.77	3.14		
H	4.87		6.49	
Total	100.00	100.00	100.00	100.00

[1] Dealer A stated that about Dec. 15, 1930, when he found his herd rather heavily infected with *Brucella melitensis* var. *abortus* he had a portion of his milk pasteurized at another dealer's plant in order that he (dealer A) might furnish pasteurized milk to those desiring it. It was such pasteurized milk that case No. 6 used for a few days and then returned to raw milk.

The first case of undulant fever recognized in a resident of Pitman was diagnosed on November 25, 1930. During the following two months the disease was recognized in five others, though some of these had actually been taken sick prior to the onset of the disease in the case in which the disease was first recognized. The general statistical data of the cases are given in Table 2. The cases are numbered in the order of their diagnosis, rather than in order of their onset.

TABLE 2.—*Data regarding cases*

Case No.	Sex	Age	Occupation	Approximate date of prodromal symptoms	Date took to bed	Agglutination titer	Date of agglutination test
1	M	33	Physician	Nov. 3, 1930	Nov. 22, 1930	[1] 500	Nov. 25, 1930
2	M	32	Bank clerk	Oct. 24, 1930	Oct. 24, 1930	[1] 500	Dec. 2, 1930
3	F	42	Dressmaker	Nov. 23, 1930	Nov. 30, 1930	1,280	Dec. 16, 1930
4	F	58	Housewife	Oct. 24, 1930	Jan. 4, 1931	1,280	Jan. 22, 1931
5	M	17	High-school student	Sept. 1, 1930	Sept. 18, 1930	640	Jan. 24, 1931
6	F	44	Housewife	Unknown	Jan. 5, 1931	1,280	Jan. 27, 1931

[1] Serum of cases 1 and 2 were not tested in dilutions higher than 1 to 500.

The positive agglutination test in case 1 suggested the application of the test in case 2, who had symptoms similar to those observed in case 1. The agglutination test in both of the cases was done at a hospital laboratory in Philadelphia. Case 3 began about the time of the recognition of the disease in cases 1 and 2 and was definitely diagnosed through a positive agglutination test (at the laboratory of the State department of health) about three weeks after onset. Case 4 was the mother of case 2; both were taken sick on the same day, October 24, 1930. Case 4 was visiting in Pittsburgh, Pa., when taken sick. Although not acutely ill, she felt that it was best to return home if she was going to be sick. Upon arriving home she found her son (case 2) in bed, and without acquainting him with

her own illness, and suppressing as best she could evidence of the same, she attended and nursed her son through the greater part of his illness. When the son began to improve, the mother went to bed, and later her blood was found positive for *Brucella* agglutinins. The diagnosis of the fifth case was established after the apparent recovery of the patient. Case 5 was actually the first case to occur and was not recognized until the presence of the disease in the village was shown by the diagnosis of cases 1 to 4, inclusive. A blood specimen taken on January 23, 1931, was found positive for *Brucella* agglutinins in 1:640 dilution. Case 6 came to light in an accidental way. The patient fell down stairs on January 5, 1931, sustaining many contusions and a probable concussion of the brain. She went to bed at once. On January 9 a nurse was engaged to attend her and the nurse routinely made observations and records of the patient's temperature. A temperature varying from 100° to 103.5° F. was found in the afternoon, with morning temperatures at or near normal. There being no apparent explanation for the fever, and as there were other cases in the village, a blood specimen was forwarded to the laboratory, where positive agglutination was obtained in 1:1280 dilution.

EPIDEMIOLOGY

Sex.—The six cases were equally divided between the two sexes.

Age.—All six cases fall in age groups in which undulant fever is frequent, though in this small group the females were all older than the males.

Occupation.—Five occupations are represented in the 6 cases (housewife being the only occupation followed by more than one of the cases). All three of the women were married; two of the husbands were employed in a railroad office, the third was a bank official. One woman did not do routine housework and handled no meat at home; the other two handled meat in the kitchen incident to preparing meals.

Place of residence.—All cases had lived in Pitman for 7 to 20 years.

Temporary absences.—Case No. 1 frequently went to Philadelphia and also to a golf course near the New Jersey seashore.

Case No. 2 was in Pittsburgh for 3 days about October 12, 1930.

Case No. 3 was frequently in Philadelphia and vicinity on business connected with her vocation.

Case No. 4 was in Pittsburgh from October 22 to October 26, 1930.

Case No. 5 visited friends in Ocean City, N. J., for a few days in August, 1930.

Case No. 6 had not been absent except to go to Philadelphia occasionally to do shopping.

Table 3.—*Dairy products and habits as to consumption of same*

Case No.	Regular milk supply	Raw or pasteurized	Supplementary milk supply	Raw or pasteurized	How used: Beverage	How used: Cereals, etc.	How used: Coffee	Extent of use	Ice cream	Butter	Cheese
1	A	R	B	P	Daily	Daily	Occasionally	1 quart for family of 2 (drank 2 to 3 glasses daily)	Frequently	Creamery	Very seldom.
2	A	R	None.		do	do	Daily	1 to 2 quarts for family of 4 (drank at least 1 glass daily).	do	do	Frequently.
3	A	R	B	P	Occasionally	do	do	1 pint milk, ½ pint cream, for family of 3	None	do	Do.
4	A	R	None.		Daily	do	do	1 to 2 quarts for family of 4 (drank 1 to 2 glasses daily).	Frequently	do	Do.
5	A	R	B	P	do	do	None	1 to 3 quarts for family of 5 (drank 3 to 5 glasses daily).	Very frequently	do	Do.
6	A	R, P			Frequently		Daily	Drank 1 glass about twice a week	Seldom	do	Freely.

Milk supply.—Table No. 3 shows the milk supply and habits of the various individuals as regards consumption of dairy products. It will be noted that all obtained raw milk from dairy A for their regular home milk supply, although case 6 used pasteurized milk from the same dairy for a few days in December and then returned to raw milk. Some of the cases used pasteurized milk from other sources as a supplementary supply. Four drank milk regularly every day, one about twice a week, and one occasionally. Five of the six used milk or cream on cereals, desserts, etc., while four used cream in coffee daily, and one used it in coffee occasionally, as he was not a regular coffee drinker.

Ice cream.—Five of the six persons ate ice cream to some extent. Four of the five cases ate ice cream that came from large ice-cream plants in Philadelphia whose product is sold over a wide area having Philadelphia as its center. Pasteurized milk and cream were used by one local ice-cream manufacturer whose product was used by the remaining case.

Butter.—The butter used by all the cases was creamery print butter obtained from various stores. Since practically all creamery butter is made from pasteurized cream, and butter is used by a large proportion of the population of the community, there seems no valid reason for suspecting that an infection caused by butter should appear exclusively in users of milk from a single dairy.

Cheese.—All cases used American cheese to some extent. None of the group reported the eating of imported cheese.

Eggs.—All of the group ate eggs, preferably soft boiled. None ate raw eggs.

TABLE 4.—*Habits as to eating of eggs, meats, etc.*

Case No.	Eggs			Beef			Pork		Lamb		Chicken
	Raw	Cooked soft	Cooked hard	Raw	Rare	Well cooked	Raw	Well cooked	Raw	Well cooked	Well cooked
1	None	Yes	No	None		Prefer	None	Bacon only.	None	Yes	Yes.
2	do	Yes	No	do		do	do	None	do	Yes	Yes.
3	do	Yes	No	Occasionally	Prefer		do	Yes	do	Yes	Yes.
4	do	Yes	No	None		Prefer	do	None	do	Yes	Yes.
5	do	Yes	No	do		do	do	do	do	Yes	Yes.
6	do	Yes	No	do		do	do	Yes	do	Yes	Yes.

Meats.—All six ate beef, three ate pork in some form, all ate lamb and chicken. One occasionally ate a little raw beef; the others ate no raw meat. Five preferred their meats well cooked; one preferred beef rare.

Water.—The borough has two public water supplies, both obtained from artesian wells. The cases occurred in the newer portion of the town, which is supplied by the newer water system. Had the water

been responsible for the spread of undulant fever it is reasonable to expect that the cases would be distributed throughout the town, occurring on the routes of the various milk dealers in numbers directly proportional to the number of persons served by each dealer. Instead of such distribution the cases all occurred among the customers of one dairyman, although he sold only 17 per cent of the milk supplied to the town.

Contact with live stock.—None of the cases gave a history of contact with animals other than dogs or cats. Cases 1, 3, and 5 had dogs and cats in the home, while case 6 had only a cat.

EVIDENCE OF INFECTION IN THE HERD SUPPLYING MILK

Dairy A was located on a farm a few miles outside the borough limits. This dairy sold about 450 quarts of milk daily, of which 350 quarts were sold in Pitman.

The herd owned by the dairy produced about 300 quarts, and about 150 quarts were purchased from another dairyman. About 200 quarts of the milk from the herd of dairy A were sold without mixing with the milk purchased from the other dairy. The remainder was mixed milk from both sources. Dairy A also sold about 5 quarts of raw cream daily in Pitman, all of which came from the home herd. The barns, milk house, and utensils of dairy A were kept in good sanitary condition.

Brucella infection was present in the herd of dairy A. About December 12, 1930, the agglutination test was applied to each animal of the herd, and of 42 animals tested 24 gave positive reactions in various titers. Fourteen gave positive reactions with the milk serum. From milk samples taken from six of the milking cows on February 5, 1931, *Br. melitensis* var. *abortus* was isolated from two samples by the staff of the Experiment Station of the United States Department of Agriculture at Bethesda, Md., and also at the laboratory of the New Jersey State Health Department. These cultures were isolated by incubation in an atmosphere of increased carbon dioxide tension and gave the reaction characteristic of *Br. abortus* (Bang) when grown on media containing thionin, methyl violet, and basic fuchsin according to the method described by Huddleson.

HISTORY OF THE HERD AFTER THE RECOGNITION OF UNDULANT FEVER IN PITMAN

When three cases of undulant fever had been recognized in Pitman and all were found to be using raw milk from dairy A, and, in addition, the presence of reacting animals in the herd was indicated as a result of laboratory tests, the State department of health issued an order

prohibiting the transportation and sale of all raw milk, cream, or other dairy products from the plant of dairy A until all reacting animals were permanently removed from the premises, unless such milk, cream, or dairy products, were first pasteurized. This order applied to all milk handled at this plant, both that produced at home and that purchased. As the disposal of such a large portion of the herd could not be made economically, the owner of dairy A installed a pasteurizing plant and, after a few days required to perfect the operation of the same, served only pasteurized milk to his customers. The operation of the plant was checked quite closely by health officials and found satisfactory. The owner of dairy A apparently left nothing undone that would make the process of pasteurization effective, as this was the only available means of carrying him over his business crisis. One month after he had begun the operation of his pasteurizing plant he reported that his milk sales were only about 20 quarts less than they had been when he sold raw milk.

Of the three cases of undulant fever in Pitman that have been *diagnosed* since dairy A discontinued the sale of raw milk, two date back to the early fall. In chronological order of onset of symptoms these two would be No. 1 and No. 3. The date of onset of the remaining case is unknown, as its recognition was incidental to treatment of accidental injuries. However, as the injury was received January 5, 1931, 5 days before the discontinuance of sale of raw milk by dairy A it seems more than likely that the infection was received prior to January 10, 1931.

EPIDEMIOLOGIC NOTES ON INDIVIDUAL CASES

Case 1.—Male 33, physician, had lived in Pitman nine and one-half years. Prodromal symptoms began between November 1 and November 3, 1930. Recalls that on Armistice Day, November 11, he was feeling very much indisposed. Took to bed November 22, 1930, when he went to a hospital in Philadelphia. One other person in the family. Patient had attended case No. 2 since October 25, 1930. Makes professional calls in surrounding rural district and frequently goes to Philadelphia and to a golf course outside the borough. Had drunk no milk nor had come in contact with livestock during such absences. Used town water. Regular home milk supply was raw milk from dairy A. Whipping cream was occasionally obtained from dairy B, this being pasteurized cream. Used cream in his coffee once a week at Rotary luncheon. Drank 2 to 3 glasses of milk daily at home. Frequently ate ice cream, used creamery butter, and seldom ate cheese. Ate eggs soft boiled, no raw eggs; no raw meat of any kind; ate no pork. Prefers meats well cooked. No contact with livestock other than a dog and cat in own home. Blood agglutination positive in 1:500 dilution, this being the highest dilution used in applying the test.

Case 2.—Male 32, bank clerk, had lived in Pitman 7 years. Three others in family, one of whom had undulant fever (case 4). Felt somewhat indisposed for a few days prior to October 24, 1930, on which date he became suddenly worse and went to bed. Was in Pittsburgh, Pa., three days during the second week in October; used no milk or cream there except on cereals or in coffee.

Used water from town's public supply. Regular home milk supply, raw milk from dairy A, taking 1 to 2 quarts for a family of four. Drank at least one glass of milk daily. Ate ice cream frequently at a downtown drug store. Creamery butter used, and occasionally ate some American cream cheese. Ate no raw eggs, and prefers eggs soft cooked. Ate no raw meats and no pork of any kind. Prefers meats well cooked. Had no contact with livestock. Blood agglutination test positive in 1:500 dilution. Not tested in higher dilution.

Case 3.—Female 42, dressmaker, wife of railroad clerk. Lived in Pitman between eight and nine years. Two others in family. Frequently absent from Pitman whenever and wherever her work called her, but particularly in suburbs of Philadelphia, usually returning home each night. Drank no milk while away from home and came in contact with no animals other than dogs and cats. Used water from town supply at home and from other sources while away at work. Regular home milk supply was raw milk from dairy A, taking one pint of milk and one-half pint of cream for a family of three. Only occasionally drank a glass of milk, but used cream daily on cereals and in coffee. Did not eat ice cream. Ate creamery butter and frequently ate cheese, American brands being used exclusively. Ate no raw eggs and prefers eggs soft cooked; occasionally ate a little raw beef. Prefers meats cooked rare. Patient handled no meat in the home, the housework and cooking being done by another. There was no contact with livestock. Blood agglutination test positive for undulant fever in 1:1280 dilution on December 16, 1930.

Case 4.—Female 58, wife of railroad official, and mother of patient of case 2. Had lived in Pitman 7 years; three others in family. Was in Pittsburgh, Pa., from October 22 to October 26, 1930, visiting relatives. On October 24 she had a chill and felt feverish afterwards. Fearing she was going to be ill for some time, she started for home. Upon arriving home she found her son (case 2) sick in bed, and without advising others of her illness she took care of her son. On January 4, 1931, she took to bed. Drank no milk while in Pittsburgh. Water supply at home was the public system. Regular home milk supply was raw milk from dairy A. At home she drank 1 to 2 glasses of milk daily and used cream on cereals and in coffee. Took 1 to 2 quarts of milk for family of four. Frequently ate ice cream purchased from local dealers who obtained their ice cream from large manufacturing plant in Philadelphia. Used creamery butter and was very fond of cheese, using chiefly American cream cheese. Ate no raw eggs and prefers eggs soft cooked. Ate no pork of any kind and no raw meats; prefers meats well cooked. Handled meat incidental to preparing meals in the home. Had no contact with livestock. Blood agglutination test positive for undulant fever in 1:1280 dilution January 19, 1930.

Case 5.—Male 17, high school student. Golf caddy in summer. Had lived in Pitman 10 years. Four others in family. Prodromal symptoms noted about September 1, 1930, and patient went to bed September 18, 1930. Had visited friends in Ocean City, N. J., for one week during August. Drank milk on this visit but does not know whether same was raw or pasteurized. Used town water supply. Regular home milk supply was raw milk from dairy A, 2 to 3 quarts for family of five. Drank 3 to 5 glasses daily and used it on cereals. Ate ice cream extensively in Pitman and while visiting in Ocean City. Used creamery butter and ate some Philadelphia cream cheese. Ate no raw eggs and no raw meats. Prefers eggs soft cooked and meats well cooked. No contact with animals other than dog and cats at home. Blood agglutination test positive for undulant fever in 1:640 dilution on January 23, 1931. The case was very mild, keeping him in bed only about two weeks, though he felt weak and tired for several weeks. Diagnosis was established after recovery of the case and after the presence of the disease in town was ascertained.

Case 6.—Female 44, wife of bank official. Had lived in Pitman 20 years. Two others in family. Had been to Philadelphia on various occasions to do shopping, etc. Drank no milk away from home. Water used came from the public town supply. Regular home milk supply raw milk from dairy A. Drank milk at times, averaging about 2 glasses per week. She took pasteurized milk for a few days in December, 1930, but then returned to using raw milk. Used cream in coffee daily. Seldom ate ice cream, used creamery butter, and ate freely of American cheeses. Ate no raw eggs or raw meat. Prefers eggs soft cooked and meats well cooked. No contact with animals except one cat at home. The onset in this case is unknown. On January 5 patient fell down stairs and probably suffered concussion of the brain, confining her to bed until January 23. On January 9 a nurse was engaged, who took temperatures routinely and found fever present, which continued until January 30. Blood agglutination test was positive for undulant fever in 1:1280 dilution on January 27, 1931.

COMMENT

Six cases of undulant fever occurring in a town of 5,387 population all used raw milk from the same dairy, which supplied 17 per cent of the milk sold in the town. Laboratory tests of the animals in the herd of this dairy revealed evidence of *Brucella* infection in a large number of the cows. In addition, *Brucella* was isolated from the milk of two of the reacting animals. While the number of cases is small, the evidence points quite conclusively to the milk supplied by this dairy as the agent transmitting the infection.

Another point of great interest to sanitarians is that no cases of undulant fever have occurred in the borough since this producer and dealer began pasteurization of all milk distributed by him, notwithstanding that the milk of some of the animals that shed *Brucella* in their milk was sold after pasteurization. Samples of milk from six cows, taken six weeks after pasteurization had begun, revealed the presence of *Brucella* in at least two of the animals.

A still further point that deserves comment is the evidence of confidence of the milk consumers in their health officer, and in the dairyman who had served them faithfully.

As has already been stated, the vendor's sales were only about 20 quarts less per day after pasteurization was begun. This indicates that a considerable number of the customers had sufficient confidence in the dairyman to continue the use of his milk after he had complied with the requirements of the health authorities in adopting measures to prevent further trouble.

The outbreak, therefore, caused a practical test of the efficiency of pasteurization in the prevention of undulant fever to be carried out under actual small-scale conditions. The results of this test have shown that pasteurization is an efficient measure of insurance against milk-borne undulant fever.

(Note.—On May 11, 1931, the order of the State Department of Health prohibiting the sale of raw milk from the plant of dairy A was

withdrawn, the owner having permanently disposed of all reacting animals. The withdrawal of this order made it permissible for dairy A to sell either raw or pasteurized milk.)

SUMMARY

1. Six cases of undulant fever occurred in a town of 5,387 population between September, 1930, and January, 1931.

2. All six cases used raw milk from the same dairy.

3. A large proportion of the cows in this herd gave laboratory evidence of *Brucella* infection, and the organism was recovered from the milk of some of them.

4. Pasteurization of the milk of this herd, even with infected animals remaining in the milking line, resulted in a cessation of cases in the consumers of the milk of this herd.

ACKNOWLEDGMENTS

It is desired to acknowledge our indebtedness to the New Jersey State Department of Health and its laboratory for information furnished from their records; to the New Jersey State Department of Agriculture for information concerning tests on the dairy herd; to the Experiment Station of the Bureau of Animal Industry, United States Department of Agriculture, at Bethesda, Md., for assistance in determining the presence of the organism in the milk of the herd; to the practicing physicians of Pitman who gladly gave every assistance possible; to the owner of the dairy A, who exhibited splendid cooperation and cheerfully gave the information sought; and to the individuals who gladly gave information concerning their illness in order that knowledge might be gathered that would assist in the prevention of further suffering and disease.

THE FUNCTIONS AND LIMITATIONS OF GOVERNMENT IN PUBLIC HEALTH EDUCATION

By ALLAN J. McLAUGHLIN, *Medical Director, United States Public Health Service*

All governmental public health activity must be based upon one of two functions:

(1) Police power.

(2) Public health education.

The activities of the early boards of health, State and local, of the past century, were based entirely upon police powers given them for the purpose of suppressing and preventing epidemic diseases. The powers given to the Secretary of the Treasury or to the United States Marine Hospital Service, now the United States Public Health Service, by acts of Congress in 1832, 1867, 1878, 1879, 1888, 1890, and

1893, were quarantine acts giving large police powers to prevent the introduction and spread of epidemic diseases. The acts of 1880 and 1882 and the joint resolution of Congress of 1888, established the "Epidemic Fund" to aid State or municipal boards of health, or otherwise to prevent introduction and spread of epidemic diseases. It was these acts which established the Marine Hospital Service as the Public Health Service of the United States, although the name was not changed until the present century.

In the closing decades of the nineteenth century, local boards of health found that rigid quarantine and other police power methods did not suppress epidemics. At first the doctors were blamed for delay or failure in reporting cases, but the real cause was found in the discovery of "carriers" of disease, persons who harbor a pathogenic parasite but show no symptoms, and in many mild cases for which no doctor was called. Even for the epidemic and communicable diseases alone, police power ordinances failed to solve the problem. Toward the close of the last century also, careful study of the functions, powers, and duties of health departments made it clear that a health department's scope of activity should include not only the communicable diseases, but also the noncommunicable diseases, and the improvement, conservation, and maintenance of health. These expansions of function, in which police power had no place, necessitated development of the only instrument that could influence them, viz, public health education.

Health officers gave up the idea that all public health work could be done by personnel on the pay roll of the health department. It was obvious that the education of individuals in personal hygiene and the securing of their voluntary help in preventing disease involved the participation of many agencies, official and unofficial, outside the health department.

In the first decade of this century unofficial voluntary agencies undertook public health activities of great importance and wide scope, and boards of education developed plans and procedures in school hygiene. The responsibility for the health of the people was still squarely placed upon the shoulders of the health officer, yet a large part of the work necessary to discharge his obligation had to be done by personnel not under his direct control. The health officer, therefore, evolved from a policeman vainly striving to stamp out epidemic disease, into a constructive statesman, courteous and persuasive, who could weld together into one united power the forces engaged in public health activities.

The most striking thing in this evolution is the change in the relative importance of work done on these two basic functions. While police power activity has dwindled to a routine procedure with its minimum utilization, the importance of public health edu-

cation has grown steadily as the more effective instrument and will grow much farther and faster in the future.

DEVELOPMENT OF PUBLIC HEALTH EDUCATION

For years after the leading public health administrators realized the need of public health education, they were unable to secure funds for such a purpose. The unofficial agencies were able to secure funds, and so they developed rapidly. In the past two decades school medical inspection and its branches, all of which are forms of public health education, made considerable progress, because often school funds were available when board of health funds were not.

Public health education depends upon research as a foundation and upon demonstration as a means of building the superstructure. In this field the great foundations have been very active in research, demonstration, or both. The work of the Rockefeller Foundation and that of insurance companies, corporations, and universities not operated by the State government, stand out prominently in modern public health development.

What is public health education? When a health administrator essays to answer this question he is appalled by its magnitude. There are many narrow definitions which may be given by health workers in their own special field. There are drives for specific purposes which are public health education in its best sense; but public health education as a whole is so complex and consists of so many independent efforts that its scope and potentialities are tremendous. Federal, State, and municipal governments are responsible for a great part of what should be done in this field and should exercise a supervising control over the remainder. There are some exceptions to this, theoretically, viz, the educational work of the endowed foundations, of the great insurance companies, of large corporations, and of the great unofficial health organizations; but, in fact, all of these are willing to correlate their work with official programs, where these exist or where such programs are wise and comprehensive enough to embrace them. Any effort to cover this subject in the brief time at my disposal must obviously be restricted to fundamentals, excluding details entirely.

GOVERNMENT—FEDERAL, STATE, AND LOCAL

As to the limitations of government in public health education, they are few. After getting away from police power, which has many limitations, we find for public health education only the lack of funds, and the lack of voluntary cooperation in individuals or groups, apathetic or complacent, who do not desire education.

FEDERAL GOVERNMENT

The Federal Government operates in public health education in two ways: (1) Direct to the citizens; and (2) through official State organizations. The products of its research are available to all by both methods. The demonstrations of how the knowledge available may be applied are made in cooperation with State departments.

Perhaps the most striking example of Federal activity was the venereal disease campaign prosecuted vigorously during and immediately following the World War. Ample funds permitted a synchronous attack on this problem in 48 States with the most complete and diversified educational propaganda ever used up to that time. Similarly, demonstrations were made which were purely educational in cooperation with States in such problems as malaria, hookworm, and pellagra. Federal surveys beginning 20 years ago showing the relation between sewage pollution of water supplies and high typhoid fever rates were responsible in no small measure for the enormous reduction in typhoid fever death rates, especially in the Great Lakes Basin. The United States Public Health Service research work in Rocky Mountain spotted fever, tularaemia, and undulant fever is of more recent date.

THE STATE GOVERNMENT

State health departments have utilized Federal research literature and demonstrations and have made research and demonstrations of their own in specially selected counties. In this they have also been aided often by the cooperation of the Rockefeller Foundation. This kind of demonstration is very effective public health education. When one full-time county health department is created and functions well, other counties learn the lesson and imitate the procedure. The State health departments also utilize all the methods of public health education for dissemination of knowledge, viz, literature, lectures, moving pictures, radio, and similar means.

LOCAL GOVERNMENTS

In the last analysis the most important governmental jurisdiction in public health education is the local government, because it is the government of the local unit which comes into direct contact with the individual. Local governments may utilize Federal or State literature, methods, demonstrations, or advice, but these, to be effective, must be applied locally. The scope of this paper will not permit me to go into details of all the methods available, literature, demonstrations, lectures, moving pictures, the radio, and others; but I desire to stress the greatest single instrument which we possess for public health education, an instrument still only partially developed and none too well coordinated with general public health programs.

SCHOOL HYGIENE

Excluding for the moment the special drives for better water supply, for annual physical examinations, for early diagnosis of tuberculosis or cancer, and many others, we have for our general objective 365 days in the year, personal hygiene for the discovery and correction of defects, for building up body resistance, for the prevention of diseases, and for the improvement and maintenance of health.

From the simple inspection for detection and prevention of the spread of communicable diseases, school hygiene has expanded to include medical inspection of school children, early discovery of defects of disease and undernourishment, and the teaching of personal hygiene. The medical inspection of school children, quite aside from the discovery of defects, has a great value as an educational influence on the other children and on the parents and family. Some few mistakes have been made—methods have been strongly advocated and then dropped; perhaps too much stress has been placed on standards—yet the net result is a tremendous achievement. Through the teachers in the schools we have the machinery for applying the latest knowledge at an age when great good can be accomplished.

The work of public health nurses in the schools is a bright chapter of achievement. Too often, however, the nurse is struggling with an overload of from 5,000 to 7,000 pupils with only the help of teachers with no training in applied child hygiene. The greatest single defect in the system is untrained teachers. The school physician can give little time, the school nurse has too many pupils, and the teacher too often knows little of teaching personal or child hygiene. The child is under the care and supervision of the teacher daily through the entire school year. Here is the greatest opportunity we have for teaching personal hygiene.

To determine the most effective machinery available for this general purpose of personal hygiene, we must answer two questions, viz:

(1) At what age does the human being most easily acquire knowledge?

(2) In what age group is he most completely and continuously under our control for teaching purposes?

The answer to both questions is the same, namely, the school age group. So that with these questions answered the most effective instrument for the general purpose of teaching personal hygiene and preventive medicine is our public school system.

GRADE SCHOOLS

There are obvious reasons why teaching personal hygiene in simple attractive form should be done in the grades from one to eight. I will mention only the facts that the young child grasps the simple truths of

personal hygiene more eagerly, and that a large proportion of pupils leave school at or before the eighth grade and therefore are no longer available for teaching purposes.

HIGH SCHOOLS

On the other hand, details more difficult to grasp, of nutrition, maternity, and paternity, are best taught to the high-school group.

COLLEGES

Going still higher into the college group of students, we have our greatest defect in failure to teach teachers to become teachers of personal hygiene in the elementary grades. Agricultural colleges and other colleges with extension courses and other efforts in home economics have a very great value, because of our primary general objective to build up body resistance by the use of proper diet.

The average teachers' college or normal school teaches hygiene to its embryo teachers in an uninteresting, didactic way. There should be less emphasis on lectures and more on practical demonstration of applied child hygiene, using the city schools as a clinic to instruct groups of student teachers.

We have not yet reached the point where all or even half of the teachers in elementary schools have received as much as two years' training beyond high school. For the teachers who have not had this college training, summer schools and extension courses will help to train some until the day when all teachers must be graduates of a teachers' college which gives an adequate practical course in applied child hygiene. Such a course is possible only by having on the regular faculty of teachers' colleges and normal schools a pediatrician and a highly trained and experienced nurse in school hygiene.

NEED FOR CORRELATION OF PUBLIC HEALTH EDUCATION ACTIVITIES

The State health department is charged with the health of all the people in all age groups; yet the most effective instrument is logically and properly placed in the department of education. There must be a correlation of all these activities in a state-wide program, with uniform application of this composite program locally.

HOW CORRELATION CAN BE SECURED

This can best be effected by a State public health council for the department of health which will include the superintendent of public instruction, president of the teachers' college, and the other heads of institutions who are engaged in this most important work of public health education.

The important thing for administrators to remember is that it matters little by whom the work is done, provided it is well done. Public health education has a grown up in a haphazard manner, fostered by a score of agencies, official and unofficial. The time has arrived when the man charged with the responsibility for the health of all the people of a State—the State health officer—should take stock of what has been done and is being done by these diverse agencies. He should formulate with their help a comprehensive program to include all existing public health education activities and to expand the work or create new work so that the field may be as completely covered as possible.

INSPECTION OF SHIPS FOR DETERMINATION OF MOSQUITO INFESTATION

By W. F. TANNER, *Surgeon, United States Public Health Service*

A study of the prevalence of mosquitoes on vessels arriving at the ports of New York and New Orleans from ports in South and Central America and the West Indies was begun in the summer of 1929 at the suggestion of Medical Director Carroll Fox, of the Public Health Service, medical officer in charge of the New York quarantine station. Interest was awakened in this subject by the recent occurrence of yellow fever in South America, with a corresponding increase of responsibility on the quarantine officers of the Public Health Service.

The problem involves a determination of the extent to which modern vessels sailing under present day conditions may be responsible for the spread of yellow fever by transporting the vector of this disease, *Aëdes aegypti*, and to enable comparison of the findings with related studies made in connection with sailing vessels.

EARLIER REPORTS OF MOSQUITOES ON VESSELS

The writer has been unable to find an account of a comparable study covering steamships except an article entitled "Mosquitoes on Ships Arriving in the Port of Liverpool from West Africa," appearing in the *Annals of Tropical Medicine and Parasitology*, volume 21, No. 4, December 31, 1927. In this article Newstead and Carter report the inspection between May, 1920, and March, 1921, of 22 ships. In only one ship were mosquitoes found, and in this vessel three female *Culex fatigans* were caught. The vessel had been invaded when lying about one-half mile off Port Gentil, and mosquitoes had been active on board up to within a two days' run from Liverpool.

The literature bearing on the occurrence of mosquitoes on sailing vessels, although appearing quite limited in extent, is extremely interesting and valuable. In the publication "Are Vessels Infected with Yellow Fever? Some Personal Observations," by Surg.

H. R. Carter, of the Public Health Service, published as Yellow Fever Institute Bulletin No. 9, July 1902, the author gives his experience with a series of sailing vessels on which yellow fever occurred during the years 1888–1890 under circumstances proving the presence on board of infected *Aëdes* mosquitoes. Doctor Carter cites two instances of infection occurring on steamships—one reported by Rosenau, occurring in 1899, and the other occurring in 1900. The replacing of sailing craft by steamships is given as a principal factor for the decrease of infection on vessels during the decade preceding publication. "Vessels as Carriers of Mosquitoes," by Passed Asst. Surg. S. B. Grubbs, of the Public Health Service, published as Yellow Fever Institute Bulletin No. 11, March, 1903, reports the examination of 82 vessels arriving at the Gulf quarantine station on Ship Island, Miss., in 1902, from ports believed to have been infested with *Aëdes* mosquitoes. Only four of these vessels were steamships, and on these no mosquitoes were found. *Culex* mosquitoes were found on 10 sailing vessels and *Aëdes* were found on three sailing vessels. The author concluded that *Culex* mosquitoes in several instances invaded the vessels in great numbers at distances of 15 to 20 miles from land, and that *Aëdes* mosquitoes invaded vessels in two instances while lying one-half mile from shore. The author's citation that 3½ per cent of the vessels brought *Aëdes* is in interesting contrast with Doctor Carter's expressed belief that vessels plying to and from southern ports of the United States during the summer season generally have *Aëdes* aboard. Passed Asst. Surg. Edward Francis, in the Annual Report of the Surgeon General of the Public Health Service for 1906, reported an inspection of the holds of 10 ships while bananas were being unloaded. Not a mosquito was seen; and the author suggested that reference to mosquitoes in such vessels might have been due to the presence of a gnat which he saw among the bananas.

THE PRESENT STUDY

Ships from Brazilian ports were included in this survey because of the immediate importance of these ports as actual or potential yellow-fever centers. Vessels from Central America and the West Indies were regarded as otherwise more suitable, because of the increased probability of bringing in mosquitoes.

We were able to make inspections only on arrival in New York. In view of the necessity for observations on the invasion of ships by mosquitoes, their continuation on board with and without opportunity for breeding, and their disappearance from the vessel, it was desirable to establish a connection with a shipping company and to secure their cooperation in the study. The United Fruit Co. appeared to

offer the best possible advantages, with their fleet of combined passenger and fruit vessels. These ships call at ports in various parts of the American tropics, and they carry medical officers. The medical department of the company readily agreed to make inspections on their vessels as outlined by us and to submit reports and specimens collected.

INSPECTIONS AT NEW YORK QUARANTINE

An appended form (Sta. File B–20) indicates the scope of the investigation on each vessel. This form may be conveniently described as consisting of three parts, viz, (A) the caption, (B) the legend, and (C) the inspection.

The caption identifies the vessel and gives the date, time utilized, and the names of the inspectors. The legend is a history of the voyage as it relates to the mosquito sanitation of the vessel and was obtained from a responsible ship's officer, with such corroborating testimony as was available. Lastly the portions of the ship inspected are stated and the results are given.

It is believed that the mosquito history of the voyage as obtained may, in a general way be accepted as fairly accurate. To obtain the confidence of the informant, assurances were given that the data were sought for purely scientific reasons and would not be used in any way detrimental to the interests of the vessel. The questioning of several persons independently usually revealed practically identical results. However, there appeared to be a general tendency to overestimate the frequency and efficiency of the use of an insecticide which had been employed on every vessel inspected.

It was understood that no vessel was to be delayed on account of the inspection. This necessitated very rapid work and limited the extent of the procedure. In a few cases the inspectors went up the bay on board and in this way were enabled practically to cover the ship.

The selected part of the vessel was examined thoroughly. The inspector, armed with a flash light and a wide-mouthed bottle (for making catches), searched carefully all nooks, corners, closets, underbunks, and overhead. After the examination with all objects in place had been completed, clothing, bedding, life preservers, or other movable objects were freely disturbed to see whether any mosquitoes had been overlooked.

All inspections included a search for potential breeding places in that part of the ship inspected.

In all, 11 inspections of ships were made. Brief reports on these ships are presented later.

INSPECTIONS ON VESSELS OF THE UNITED FRUIT CO.

The United Fruit Co. operates a fleet of 10 vessels plying between New York and ports in Central America, South America, and the West Indies, and a fleet of 12 vessels between New Orleans and these ports.

The ship surgeons were provided with blank forms for making reports and with mimeographed instructions outlining the procedure to be followed. At the end of each voyage the report was delivered to the Public Health Service officer inspecting the vessel in quarantine, who delivered it, along with specimens of mosquitoes caught, to the laboratory of the New York quarantine station. All specimens were sent to the United States National Museum at Washington for identification.

A total of 18 reports were received from 9 vessels entering New York, and 16 reports were received from 10 vessels entering New Orleans. Some of the vessels did not report at all and some others reported on only a few voyages. Specimens of mosquitoes caught accompanied four of the reports at New York and seven of the reports at New Orleans. Reports from New Orleans covered the period from the middle of June to the latter part of July, 1929, whereas reports were made at New York covering the period from the beginning of June to approximately the middle of September, 1929.

A blank report form and copy of instructions to the ship surgeon are appended.

A brief résumé of the report covering each voyage is given later.

DISCUSSION

It was intended that a large number of ships would be inspected on arrival in New York quarantine, and for this purpose the services of available medical officers or other trained employees were to be utilized. However, the regular work of the station proved too much to allow the use of the personnel to more than a very limited extent, especially since the summer is also the principal season of annual leave taking. The dearth of personnel resulted in the inspection of only a few vessels.

Every vessel inspected in New York reported the use of an insecticide. As the various compartments were inspected, stewards were questioned as to the frequency and quantity of the insecticide used, and there appeared to be a striking correlation between its use and the amount of insect life on the vessel. Whether or not its use was a factor in ridding the vessels of mosquitoes can only be conjectured.

Officers on several vessels volunteered their opinion that mosquitoes leave a ship within 48 to 60 hours after leaving port. They believed that this was due to the mosquitoes' dislike for the "salt air" at sea.

That the number of mosquitoes on the vessels inspected tended to decrease rapidly with increasing distance from port is clearly indicated.

Possible breeding places were not found on any of the vessels inspected at New York except the steamship "*I*", and no evidence of breeding was found. This vessel had been alongside at several ports in the Dominican Republic reported as heavily infested with mosquitoes. The noninfestation of the vessel is of interest. Information concerning the prevalence of mosquitoes about the docks, or weather and wind conditions, was not obtained.

The steamship "*H*" was the only vessel found infested on arrival. It was only three days from Habana. All mosquitoes found were caught. The history obtained indicated much heavier infestation at Habana.

Reports obtained from the ship surgeons of the fruit company's vessels were very meager as to the sanitary conditions about the piers, direction of the wind, and other related data. This was probably due to a lack of appreciation of what was desired.

Four specimens were submitted which were regarded as mosquitoes but which proved to be other insects. In three instances specimens of mosquitoes were present also.

Only one mosquito was identified as *Aëdes aegypti* out of a total of 41 specimens submitted from the fruit vessels. None of the mosquitoes caught in New York belonged to this species. It appears unusual for vessels of the modern type to harbor *Aëdes aegypti.*

An effort to tabulate the reports to show the relative sanitary condition of the ports visited, in regard to mosquito prevalence, met with many difficulties, owing to the lack of satisfactory data. However, Puerto Barrios, Guatemala, appeared to be the outstanding port where infestation was most often reported as heavy.

The accompanying table summarizes the most important data in connection with the mosquitoes caught on the fruit vessels.

Table 1.—*Mosquitoes caught, showing kinds of mosquitoes and position of vessel in port*

[Vessels of the United Fruit Co.]

Number of mosquitoes	Genus	Species	Approximate date caught, 1929	Place caught		Previous ports	Wharf or stream at port of capture [1]	Name of vessel	Remarks
				In port at—	After leaving				
1	Aëdes	Taeniorhynchus Wied.	June 21		Habana	Limon, Cristobal	Not stated	Toloa	
3	do	Sp? but not aegypti	June 27–28	Habana		None	Alongside	Ulua	
1	Culex	Quinquefasciatus Say	Sept. 13	Barrios		Santiago, Kingston, Castilla, Tela.	do	Tivives	
1	do	Sp?	June 22–23	do		Santiago, Kingston, Castilla, Tela, and Belize.	do	do	
2	do	Sp?	July 1–2	Habana		None	do	Heredia	
1	Aëdes	Aegypti L.	July 22–24	do		do	do	do	
1	Culex	Quinquefasciatus Say	July 11		Habana	do	do	Cartago	
1	do	Sp?	July 7	Limon		Cristobal	do	Coppename	
4	Aëdes	Sp? but not aegypti	June 24–26	Habana		None	do	Parismina	
7	do	do	June 26–28		Habana	do	do	do	
2	do	do	July 5		Barrios	Habana, Cristobal	do	do	
1	do	do	July 8		Habana	Cristobal, Barrios	do	do	
1	Culex	Sp?	June 28		do	None	do	do	
3	Aedes	Taeniorhynchus Wied.	July 2	Barrios		do	do	Abangarez	
1	Culex	Sp?	do	do		do	do	do	
4	do	Quinquefasciatus Say	July 4	Tela		Barrios	do	do	
1	do	Sp?	July 7		Belize	Barrios and Tela	1½ miles in stream	do	Alongside at previous ports.
4	do	Quinquefasciatus Say	July 18	Tela		Belize and Barrios	Alongside	do	
2	do	do	July 19		Barrios	Belize and Tela	½ mile in stream	do	Do.

[1] When capture was made after leaving a port, reference is made to the position of the vessel at that port.

RECOMMENDATIONS

The study is of sufficient importance to be carried on. However, the time for the work is at the beginning of the ship's voyage rather than at its end, and the proper place is at the infested port. The placing of suitably trained personnel, under proper direction, in several selected ports, at times to accompany vessels on voyages to ports of the United States, would appear to be an appropriate research procedure. An additional factor of security from the introduction of yellow fever would be afforded by the observation and control of vessels entering yellow-fever ports and destined for our southern ports.

ACKNOWLEDGMENTS

The writer desires especially to express his appreciation of the cooperation rendered by Dr. W. E. Deeks, general manager of the medical department of the United Fruit Co., and the ships' officers who assisted so willingly. Our thanks are also due the United States National Museum for valuable assistance in the identification of specimens. Much helpful information and advice was given by Medical Director Carroll Fox, and the officers of the quarantine stations at New Orleans and New York rendered valuable assistance.

APPENDIX

VESSELS INSPECTED AT NEW YORK

(1) The steamship "*A*", passenger, arrived March 27 from Buenos Aires, Montevideo, Santos, Rio de Janeiro, Bahia, and Trinidad. It lay alongside piers in the first, third, and fourth ports, anchored in stream in the others. Three inspectors boarded it. The ship's surgeon reported that mosquitoes were on board in South American ports. The insecticide had been used about every second day.

Portion of ship inspected.—Crew's quarters, 6 or 8 rooms, and complete forecastle; passenger department, complete third class, about 15 cabins in the second class, about 12 cabins in first class.

Results.—No evidence of mosquitoes or breeding places; a few flies seen.

Time of inspection.—Fifty-five minutes.

(2) The steamship "*B*", cargo, arrived March 28 from Rosario, Ibucuy, Santos, Port of Spain. It lay alongside piers in all ports except Port of Spain, where it anchored in stream 1½ miles out. Two inspectors boarded it. The captain reported that a few mosquitoes were on board in the continental South American ports but none at Port of Spain. He stated that no mosquitoes were seen on board after two days out from port. The insecticide had been used every day or two against insects, with no particular reference to mosquitoes.

Portion of ship inspected.—Complete superstructure.

Results.—No evidence of mosquitoes or breeding places; a few flies, many roaches, and many spiders were seen.

Time of inspection.—Thirty-three minutes.

(3) The steamship "*C*", cargo, arrived March 28 from Bahia, Blanca, Buenos Aires, Montevideo, Santos, Rio de Janeiro, Bahia, and Trinidad. It lay alongside piers in all ports except the third (one-fourth mile out), fifth (one-half mile out) and seventh (distance not given). Two inspectors boarded it. The captain reported a few mosquitoes were on board in the first, second, and fourth

ports; none in the other ports. Insecticide had been used about three times a week throughout the superstructure against insects in general.

Portion of ship inspected.—All of crew's quarters and officers' cabins, mess room.

Results.—No evidence of mosquitoes or breeding places; a few flies, roaches, and other insects were seen.

Time of inspection.—Thirty-five minutes.

(4) The steamship "*D*", passenger, arrived April 3, from five eastern South American ports, via Trinidad, Barbados, and Martinique. It was alongside piers in all ports except Montevideo (one-fourth mile out), Barbados (1 mile out), and Martinique (1 mile out). Two inspectors boarded it. The purser reported that mosquitoes were seen on board at Buenos Aires but not at other ports. Insecticide was generally used but had not been used on the present northbound voyage.

Portion of ship inspected.—Entire third class, including cabins, saloons, closets, and hallways, and about 12 unoccupied cabins used for storage.

Result.—No evidence of mosquitoes or breeding places; a few moths, some small winged insects resembling a gnat, roaches, spiders, numerous cobwebs under bunks.

Time of inspection.—Forty-five minutes.

The presence of numerous insects is interesting in connection with the reported nonuse of the insecticide.

(5) The steamship "*E*", passenger, arrived from Buenos Aires, Montevideo, Santos, and Rio de Janeiro, via Trinidad, April 10. It was alongside piers in all ports except Montevideo (one-half mile out) and Trinidad (2½ miles out). Two inspectors boarded it. Mosquitoes were seen on board at Santos; reports from other ports were indefinite. The captain reported daily use of the insecticide after leaving Buenos Aires. This port had begun requiring antimosquito measures on shipboard.

Portion of ship inspected.—Entire crew's quarters and mail rooms.

Result.—No evidence of mosquitoes or breeding places. No insect life of any kind except one roach was seen.

Time of inspection.—Forty-five minutes.

The practical absence of insect life is interesting in view of the liberal use of the insecticide.

(6) The steamship "*F*", passenger, arrived April 20 from Buenos Aires, Montevideo, Santos, Rio de Janeiro, Trinidad, and Barbados. It was alongside piers in all ports except Montevideo (one-fourth mile out), Trinidad (4 miles out) and Barbados (one-half mile out). Two inspectors boarded it. Information was obtained from the purser and deck steward. Mosquitoes were seen on board at Buenos Aires, but not at other ports. Quarantined two days at Buenos Aires to complete a 6-day period, and ordered to use insecticide. Insecticide had been used daily throughout the voyage.

Portion of ship inspected.—Entire crew's quarters except officers' cabins, printing room.

Results.—No evidence of mosquitoes or breeding places; numerous roaches and a few flies were seen.

Time of inspection.—One hour.

The deck steward commented that mosquitoes were never seen on a ship after two days at sea.

(7) The steamship "*G*", passenger, arrived May 8 from Buenos Aires, Montevideo, Santos, Rio de Janeiro, Bahia, and Trinidad. It was alongside piers in all ports except Montevideo (one-half mile out), Bahia (2 miles out), and Trinidad (5 miles out). Two inspectors boarded it. Information was

obtained from the purser and purser's apprentice. Mosquitoes were seen on board in Buenos Aires and Rio de Janeiro. Quarantined at Buenos Aires to complete six days from last port and required to use insecticide. This was used about twice weekly throughout the superstructure.

Portion of ship inspected.—Complete inspection of crew's quarters and of third-class department.

Results.—No evidence of mosquitoes or breeding places; a few flies and a few roaches were seen.

Time of inspection.—One and one-half hours.

(8) The steamship "*A*", passenger, arrived from the same ports as in voyage No. 1 above. It lay alongside piers in all ports except Montevideo (one-fourth mile out), Bahia (one-half mile out), and Trinidad (3 miles out). Three inspectors boarded it. Information was obtained from the ship's surgeon, purser, freight clerk, and two passengers. The report was unanimous that no mosquitoes had been seen on board in any port. The insecticide had been used daily throughout the superstructure.

Portion of ship inspected.—All of crew's quarters except engine department and officers' cabins, all of third-class and second-class passenger departments, about half of first-class passenger department, animal room (occupied by parrots and monkeys).

Result.—No evidence of mosquitoes or breeding places; a few flies were seen in the animal room, otherwise no insect life was observed on the vessel.

Time.—Fifty minutes.

(9) The steamship "*H*", passenger, arrived June 4, 10 a. m. from Habana, having left that port June 1 at 11 a. m. Vessel lay alongside the pier at Habana. Two inspectors boarded it. Ship's surgeon minimized number of mosquitoes on board in Habana, whereas the third officer and members of the crew reported that many mosquitoes were on board in that port. Insecticide had been used every fourth day in first-class department, more sparingly and less often in the third-class, very irregularly or not at all in the crew's quarters. It had not been used in the crew's quarters on the present return voyage.

Portion of vessel inspected and results.—Crew's quarters: Two mosquitoes were caught in the engine crew's quarters, five were caught in the steward's sleeping quarters. Third class: Two mosquitoes caught (one in mess and one in sleeping quarters). First class: About half the cabins inspected and no mosquitoes were found, but one was caught in a steward's room in this department. Holds Nos. 1 and 2 were entered and inspected before the cargo (pineapple) was unloaded. Many gnats and flies were seen, but no mosquitoes.

No breeding places were found, but the inspection of the ship for this purpose was not sufficiently thorough entirely to exclude the possibility of breeding on board, although it is very unlikely. The ship had running water throughout and no known containers of stagnant water.

The mosquitoes were identified as *Culex quinquefasciatus* Say.

(10) The steamship "*F*", passenger, arrived June 26 from the same ports given for this vessel in No. 6 above. It lay alongside piers in all ports except Montevideo (one-fourth mile out), Rio de Janeiro (1 mile out), Trinidad (2 miles out), and Barbados (1 mile out). It was boarded by two inspectors. The captain reported that no mosquitoes had been observed on board during the voyage. It had remained in quarantine two days at Buenos Aires to complete a 6-day period from the last port (Rio de Janeiro). Buenos Aires authorities required the daily use of the insecticide on board, and it had been used daily throughout the superstructure during the voyage.

Portion of ship inspected.—The entire third-class department.

Result.—No evidence of mosquitoes or breeding places.

Time.—Forty minutes.

(11) The steamship "*I*", passenger, arrived August 26 from ports in the Dominican Republic, via Turck Island. The principal Dominican ports were Macoris, Azua, Barahona, Santo Domingo, La Romana, Samana, Sanchez, Puerto Plata, and Monte Cristi. The vessel was alongside piers at all ports except Samana, Sanchez and Turck Island, lying in stream half mile off shore at these places, and at Monte Cristi in stream 2 miles off shore. Information was obtained from the ship's surgeon, purser, chief steward, several passengers, and several members of the crew. Oddly enough there was unanimity of report that mosquitoes were very prevalent in almost all the ports entered, but that nowhere did they come on board the vessel. The insecticide was used three or four times during the entire voyage from New York and return (17 days).

Portion of ship inspected.—Entire crew's quarters, the entire passenger department, storerooms, portion of the holds.

Results.—No evidence of mosquitoes or breeding.

This is an old ship (built in 1902). There is no running water in the passenger cabins or crew's quarters. In several unoccupied cabins the water containers held stagnant water, dust having collected on the containers and on the surface of the water. Water from the condensation of steam had collected to a depth of 6 inches or more in a compartment beneath the floor supporting the windlass (aft). The exposed water surface was several feet across. This was clean water.

The reason for no breeding aboard the ship is not obvious. Clearly the potentiality is great. The ship surgeon was emphatic in saying, "The ports are full of mosquitoes but they do not come on the ship."

REPORTS ON VESSELS ENTERING NEW YORK

(1) "*No. 1*" left New York June 1, visited Habana, Cristobal, Limon, Cristobal, and Habana. The report of inspections was meager.

One "*Aëdes taeniorhynchus* Wied." was caught 24 hours from Habana, northbound.

(2) "*No. 2*" left New York May 29, visited Kingston, Cristobal, Cartagena, Pto. Colombia, Santa Marta, and Kingston. Inspection report incomplete, but stated that no mosquitoes were found.

(3) "*No. 3*" left New York June 5, visited Kingston, Cristobal, Cartagena, Pto. Colombia, Santa Marta, and Kingston. Inspection report complete. No mosquitoes found.

(4) "*No. 4*" left New York June 8, visited Habana, Cristobal, Port Limon, Cristobal, and Habana. Arrived at Port Limon 8 a. m., June 20, 1929. At the inspection of the same date a diptera was caught on deck. This was identified as a "*Psilopus* sp." The report indicates that no mosquitoes were encountered during the voyage. (The diptera was reported by the ship's doctor as a mosquito.)

(5) "*No. 5*" left New York June 8, visited Santiago, Kingston, Port Castilla, Tela, Port Barrios, Belize, Port Barrios, Kingston, and Santiago. Fourteen diptera were caught and reported as mosquitoes. Thirteen of these were identified as "*Chironomus* sp." One mosquito was identified as a *Culex* (sp.?). This mosquito was caught at Port Barrios on return voyage (in the doctor's cabin.).

(6) "*No. 1*" left New York June 29. Stations visited are not given. The report was very meager and gives no further information than the statement that two passengers reported that they were bitten by mosquitoes at Cristobal.

(7) "*No. 6*" left New York June 22, visited Habana, Cristobal, Limon, Cristobal, and Habana.

Three mosquitoes, identified as "*Aëdes*, species not determined but not *aegypti*," were caught at Habana on the outward voyage. Mosquitoes reported as numerous at Habana, few at Cristobal, none at other ports.

(8) "*No. 3*" left New York July 3, visited Kingston, Cristobal, Cartagena, Pto. Colombia, Santa Marta, and Kingston. The report states that not a single mosquito was found on the entire voyage. Daily inspections were reported.

(9) "*No. 7*" left New York July 11. The report is very meager. The words "no mosquitoes" were written across its face.

(10) "*No. 8*" left New York July 13, visited Habana, Cristobal, Limon, and Habana. The report states that no mosquitoes were seen on board.

(11) "*No. 7*" left New York July 20, visited Habana, Cristobal, Limon, Cristobal, and Habana. A few mosquitoes were on board at Cristobal, outward voyage. Otherwise none reported. None caught.

(12) "*No. 2*" left New York July 24, visited Kingston, Cristobal, Cartagena, Pto. Colombia, Santa Marta, Kingston. The report states that no mosquitoes were found on board during the voyage.

(13) "*No. 1*" left New York July 27. The report is very meager. It states that a number of passengers were bitten at Port Limon. No mosquitoes were caught.

(14) "*No. 3*" left New York July 31, visited Kingston, Cristobal, Cartagena, Pto. Colombia, and Santa Marta. Daily inspections are reported, but no mosquitoes were observed.

(15) "*No. 5*" left New York August 3. Ports visited are not reported. The report only states that no mosquitoes were found.

(16) "*No. 6*" left New York August 31, visited Santiago, Kingston, Castillo, Tela, Barrios, and Belize. One mosquito was caught at Barrios; no others seen. The mosquito was identified as a *Culex quinquefasciatus* Say.

(17) "*No. 4*" left New York August 31, visited Habana, Cristobal, Limon, Cristobal, and Habana. Daily inspections are reported, but no mosquitoes were found on board.

(18) "*No. 3*" left New York August 28, visited Kingston, Cristobal, Cartagena, Pto. Colombia, and Kingston. Daily inspection reports were made, but no mosquitoes were found on board.

REPORTS ON VESSELS ENTERING NEW ORLEANS

(1) "*No. 9*" left New Orleans June 15, visited Habana, Cristobal, Barrios, and Habana. Mosquitoes were reported on board, especially at Habana, but none was caught.

(2) "*No. 10*" left New Orleans June 15, visited Cristobal, Limon, Bocas del Toro, Almirante, and Cristobal. Daily inspections were reported but no mosquitoes were observed.

(3) "*No. 11*" left New Orleans June 19, visited Habana, Castilla, and Habana. A few mosquitoes were reported on board at Habana. None was caught.

(4) "*No. 12*" left New Orleans June 21, visited Belize, Barrios, Tela, and Barrios. A few mosquitoes were reported on board at Barrios. None was caught.

(5) "*No. 13*" left New Orleans June 22, visited Habana, Cristobal, Barrios, and Habana. Many mosquitoes were reported on board at Habana, few at Barrios. During this voyage 14 *Aëdes*, species not determined but not *aegypti*, and one *Culex*, species not determined, were caught. Eleven *Aëdes* and the *Culex* were caught either at Habana, outward bound or en route from Habana to Cristobal. These evidently came on board at Habana. Two *Aëdes*, species not determined but not *aegypti*, were caught about one day after Barrios. One

Aëdes, species not determined but not *aegypti*, was caught the second day after leaving Habana on the return voyage. This was the largest number of specimens submitted from any one voyage during the study.

(6) "*No. 14*" left New Orleans June 22, visited Cristobal, Pto. Colombia; Cristobal, Bocas del Toro, and Cristobal. A few mosquitoes were reported as observed at Bocas del Toro. None was reported at other ports. None was caught.

(7) "*No. 15*" left New Orleans June 26, visited Habana, Castilla, and Habana. *Culex* mosquitoes were reported on board in both ports. None was caught.

(8) "*No. 16*" left New Orleans June 28, visited Barrios, Tela, Barrios, and Belize. A few mosquitoes were reported on board at Barrios and Tela. None at Belize.

Three *Aëdes taeniorhynchus* Wied. and one *Culex*, species undetermined, were caught at Barrios. Four *Culex quinquefasciatus* Say were caught at Tela. One *Culex*, species undetermined, was caught two days after leaving Belize; but since the vessel was anchored in the stream at Belize, 1½ miles out, and remained there only a few hours, it appears most likely that this mosquito came on board at a previous port.

(9) "*No. 17*" left New Orleans June 29, visited Habana, Cristobal, Barrios, and Habana. A few mosquitoes were reported on board at Habana, outward bound; none at other ports. The report states that the sanitary condition of Barrios in regard to mosquitoes was bad, but that the breeze was in the ship's favor and no mosquitoes came on board. Two *Culex*, species undetermined, were caught on board at Habana, outward voyage.

(10) "*No. 18*" left New Orleans June 29, visited Cristobal, Limon, and Almirante. A few mosquitoes were reported on board at Limon; none at other ports. Unfavorable breeze brought mosquitoes on board at Limon, where one *Culex*, species undetermined, was caught. Three other diptera were caught at Limon and were identified as "*Chironomus* sp."

(11) "*No. 11*" left New Orleans July 3, visited Habana, Castilla, and Habana. No mosquitoes were observed.

(12) "*No. 12*" left New Orleans July 5, visited Barrios, Tela, and Barrios. Many mosquitoes were reported on shore at Barrios, but the wind was in the ship's favor. Six diptera, supposedly mosquitoes, were caught on board at Barrios, but these were identified as "*Chironomus* p.," 2; "*Gnophomyia tristissima* O. S.," 2; "*Geronomyia rostrata* Say," 1; and "*Tricyphona hyperborea* O. S.," 1.

(13) "*No. 9*" left New Orleans July 6, visited Habana, Cristobal, Barrios, and Habana. Mosquitoes were reported prevalent on shore at Habana and Barrios. One *Culex quinquefasciatus* Say was caught one day after leaving Habana, outward voyage. Another diptera, supposedly a mosquito, caught the same day was identified as "*Chironomus* sp."

(14) "*No. 15*" left New Orleans July 10, visited Habana, Castilla, and Habana. A few mosquitoes were on board at Castilla, where the wind was from shore. No mosquitoes were caught.

(15) "*No. 16*" left New Orleans July 12, visited Belize, Barrios, Tela, and Barrios. A few mosquitoes were reported on board at Tela and Barrios, in spite of the fact that the vessel anchored one-third mile out at each port. However, the breeze was from the land. Four *Culex quinquefasciatus* Say were caught on board at Tela, and two *Culex quinquefasciatus* Say were caught one day after leaving Barrios on the return voyage.

(16) "*No. 17*" left New Orleans July 20, visited Habana, Cristobal, Barrios, and Habana. Three mosquitoes were seen on board at Habana, none at other ports. However, Barrios was reported in bad sanitary condition in regard to mosquitoes. One mosquito, caught at Habana, was identified as an *Aëdes aegypti* L.

Forms Used for Inspection Report

MOSQUITO SURVEY

Sta. File B-20

-- (Date)

-- (Vessel—Nationality, type, name)

-- (Time)

-- (Inspection made by)

Port of Call	Date of arrival	Days	Position	Evidence mosquitoes on board	Precautions by port authority
1.					
2.					
3.					
4.					
5.					
6.					

History of mosquito infestation----------
Precautions taken against mosquitoes----------

INSPECTION

Crews quarters----------
Passenger department----------
Other inspections----------
Results----------
Source of information----------
Comment----------
Laboratory identification----------

REPORT OF SHIP'S SURGEON

S. S. ----- -------------- United Fruit Co.
Date of departure from New York ----------
New Orleans ----------

Port of call	Date and hour of arrival	Date and hour of departure	Position of vessel in port [1]	Relative numbers and varieties of mosquitoes on board while in port	Sanitary condition of port in regard to mosquitoes
1.					
2.					
3.					
4.					
5.					
6.					

[1] If anchored in stream, how far from nearest inhabited shore. If at a wharf or dock, are there any mosquito-breeding receptacles?

Describe possible breeding places on the vessel and note whether breeding actually occurs:

When mosquitoes are found to have come on board at a port, describe direction and approximate velocity of the wind, so as to indicate whether or not this may have been a factor:

Please catch mosquitoes every day that they can be found on the ship. It would be very valuable if mosquitoes of every species seen on board are caught. A wide-mouthed test tube should be used, in the bottom of which should be placed elastic bands which have been soaked in chloroform, held to the bottom with a disk of blotting paper. This tube should be kept closed. Mosquitoes caught should be shaken out into a pill box and held in place by small pieces of crumpled tissue paper. (Cotton is not desirable because the mosquitoes become entangled in the cotton fibers.) The pill boxes should be dated and labeled to show the location on the vessel where the mosquitoes were taken.

Please fill in daily inspection report on sheet 2.

DAILY INSPECTION REPORT

(To begin on arrival at first port of call)

Date	Part of ship inspected	Time duration of inspection	Prevalence of mosquitoes	Kinds of mosquitoes	Number caught

-----------------------------,
Ship's Surgeon.

Please deliver this report, together with specimens of mosquitoes and any other pertinent information to the quarantine doctor at New York quarantine, or if your vessel does not enter New York, deliver to the Public Health Service doctor making the quarantine inspection with request that he transmit them by mail to United States quarantine station, Rosebank, Staten Island, N. Y.

INSTRUCTIONS TO SHIP SURGEONS FOR PREPARATION OF THE REPORT ON THE MOSQUITO SURVEY

In cooperation with the United States Public Health Service a study of the carrying of mosquitoes by vessels is being made. The doctors on our vessels are requested to take part in this study and to make observations to determine the presence of mosquitoes on board. A blank report form will be supplied for each trip. This form will be carefully completed and will be delivered, together with specimens collected, to the Public Health Service doctor boarding the vessel at quarantine, with the request that they be delivered or mailed to the United States quarantine station, Rosebank, Staten Island, N. Y.

The explanations below will assist you in preparing the report:

Port of call.—Each port at which the vessel stops after leaving the United States is a port of call. An accurate record of the position of the vessel in port is of extreme importance. If anchored in stream the distance from the wharf and also the distance from the nearest inhabited shore should be stated. If lying alongside the wharf, the distance from the nearest inhabited shore should be shown. The presence or absence of mosquito-breeding about the pier, or wharf, is important.

The relative numbers of mosquitoes on board while in port may be stated in general terms, as "very numerous," "many," "moderate," "few," "none," or other terms which may best apply to the situation. Identification of varieties may be made, but in any case it is desirable to catch a sufficient number to include the different varieties which are present. Entry in the space for this information may best be made on leaving the port from memoranda on observations made from time to time.

A description of the sanitary condition of the port in regard to mosquitoes may be made from observations made on this and previous trips, from information obtained from various sources, and possibly from the local health authorities. The condition at and about the docks is especially important.

Information as to breeding places, or their absence, on the vessel is desirable, since otherwise the significance of mosquitoes on the ship remains in doubt.

A description of the prevailing wind, to indicate whether or not mosquitoes may have been blown onto the vessel, is desirable. This is of more importance when mosquitoes have appeared on the ship while anchored in stream.

An important part of this study consists in a determination of the length of time mosquitoes remain on the ships after leaving port. To this end it is necessary to make an inspection of the ship daily, both while in port and each day thereafter throughout the voyage. Such an inspection should include all parts of the ship to which mosquitoes may gain access. Enough test tubes, prepared as

described, should be carried for making the catches. An inspection during the late afternoon may be made if the vessel arrives in the first port during the forenoon; if arriving after midday the inspection on the vessel may be deferred to the next day. Thereafter one inspection each day, at a convenient hour, may be made. Those inspections should continue until the ship returns to the United States port. A careful survey of the sides and overhead of the compartment, underneath and behind beds, in closets and nooks, and finally disturbing, or removing articles of clothing or other objects affording hiding places, may often result in finding mosquitoes that otherwise would not be seen. The *Aëdes* is especially likely to be found resting in shady corners on dark objects hanging around the room, and such objects should, therefore, be inspected before being disturbed. The use of a flash-light is regarded as indispensable.

In filling in the daily inspection report considerable care as to detail is desirable. Although it would be ideal to have a daily inspection throughout the entire vessel, including crews' quarters, passenger departments, closets, pantries, galleys, holds, etc., you may not find it practicable to make such complete inspections every day. Therefore, please record the inspection as actually made each day.

Doctors on our vessels are instructed to carry out these instructions.

Respectfully,

W. E. Deeks,
General Manager, Medical Department.

COURT DECISION RELATING TO PUBLIC HEALTH

Ordinance prohibiting sale in city of ice manufactured outside of city, unless made with distilled water, held void.—(Texas Court of Civil Appeals; City of El Paso et al. *v.* Jackson et al., 40 S. W. (2d) 845; decided June 25, 1931.) An ordinance of the city of El Paso provided as follows:

Section 1. It shall be unlawful for any person, firm, or corporation to sell or offer for sale or distribute in the city of El Paso any ice manufactured outside the city of El Paso, except ice manufactured wholly with distilled water.

Sec. 2. Any person violating the foregoing ordinance shall be deemed guilty of a misdemeanor and shall be fined the sum of $10, and each sale or offering for sale shall constitute a separate offense.

A suit was brought against the city and certain of its officials to restrain them from enforcing or attempting to enforce the said ordinance. The trial court held the ordinance void, such action being based upon the conclusion that it was discriminatory and imposed a burden on interstate commerce. On appeal the judgment enjoining the enforcement of the ordinance was affirmed by the court of civil appeals. That court said that there was ample evidence to the effect that the cost of making ice from distilled water was about 50 per cent more than the cost of making it from raw water, and that the enforcement of the ordinance could have but one practical result,

namely, a denial of the right of a citizen outside of the city to sell his ice therein. In summing up its conclusions, the court said:

We have concluded that, under the facts in this record, the effect of the ordinance is to create a monopoly in favor of those manufacturing ice in the city; is an unreasonable discrimination against people living outside the city; and imposes a burden upon interstate commerce.

DEATHS DURING WEEK ENDED SEPTEMBER 5, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended September 5, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended September 5, 1931	Corresponding week, 1930
Policies in force	74, 961, 597	75, 680, 042
Number of death claims	11, 715	10, 059
Death claims per 1,000 policies in force, annual rate	8. 1	6. 9
Death claims per 1,000 policies, first 36 weeks of year, annual rate	10. 0	9. 8

Deaths [1] from all causes in certain large cities of the United States during the week ended September 5, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Sept. 5, 1931				Corresponding week, 1930		Death rate [2] for the first 36 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	6, 684	9. 8	588	[4] 46	10. 2	643	12. 3	12. 2
Akron	30	6. 1	3	30	10. 2	5	7. 9	8. 0
Albany [5]	30	12. 1	4	79	15. 5	3	13. 9	15 2
Atlanta	73	13. 7	8	82	13. 2	9	15. 4	16. 0
White	32		5	79		4		
Colored	41	(6)	3	86	(6)	5	(6)	(6)
Baltimore [5]	182	11. 7	18	61	12. 7	24	14. 8	14. 3
White	129		10	43		12		
Colored	53	(6)	8	125	(6)	12	(6)	(6)
Birmingham	72	13. 9	9	91	18. 1	11	14. 0	14. 1
White	26		4	69		5		
Colored	46	(6)	5	122	(6)	6	(6)	(6)
Boston	173	11. 5	15	43	11. 9	16	14. 4	14. 4
Bridgeport	35	12. 4	2	33	12. 1	6	11. 4	11. 4
Buffalo	110	9. 9	7	29	14. 0	16	13. 4	13. 2
Cambridge	31	14 2	4	80	7. 8	1	12. 5	11. 9
Camden	19	8. 3	2	35	12. 3	4	14. 7	13. 9
Canton	19	9. 3	3	69	5. 4	1	10. 4	10. 3
Chicago [5]	556	8. 4	47	42	8. 9	45	11. 0	10. 6
Cincinnati	122	13 9	15	90	14. 2	12	16. 3	15. 8
Cleveland	169	9. 7	21	61	9. 9	13	11. 4	11. 4
Columbus	60	10. 6	5	49	10. 4	11	13. 9	16 0
Dallas	41	7. 9	3		9. 5	5	11. 5	11. 9
White	27		2			3		
Colored	14	(6)	1		(6)	2	(6)	(6)
Dayton	31	7. 8	4	56	9. 8	4	12. 0	10. 5
Denver	77	13. 8	10	97	13. 2	12	14. 2	15. 0
Des Moines	37	13. 3	2	35	9. 1	0	11. 3	12. 0
Detroit	211	6. 7	18	29	6. 9	25	8. 6	9. 6

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended September 5, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Sept. 5, 1931				Corresponding week, 1930		Death rate for the first 36 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Duluth	18	9.2	1	25	8.7	3	11.1	11.3
El Paso	31	15.4	4	-------	16.7	9	16.3	18.0
Erie	17	7.5	1	19	8.5	2	10.9	11.4
Fall River [5, 7]	18	8.1	2	45	6.8	1	11.6	12.2
Flint	11	3.5	1	13	8.3	4	7.1	9.4
Fort Worth	34	10.6	4	-------	8.3	0	11.0	11.2
White	29	-------	4	-------	-------	0	-------	-------
Colored	5	(6)	0	-------	(6)	0	(6)	(6)
Grand Rapids	38	11.5	3	44	8.6	4	9.3	10.5
Houston	71	11.9	5	-------	9.0	6	11.3	12.3
White	48	-------	4	-------	-------	6	-------	-------
Colored	23	(6)	1	-------	(6)	0	(6)	(6)
Indianapolis	82	11.6	7	58	13.4	9	14.2	15.0
White	68	-------	7	66	-------	9	-------	-------
Colored	14	(6)	0	0	(6)	0	(6)	(6)
Jersey City	51	8.3	7	62	9.9	7	11.8	11.6
Kansas City, Kans.	17	7.2	0	0	14.5	4	12.9	11.6
White	16	-------	0	0	-------	4	-------	-------
Colored	1	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo.	73	9.3	4	30	11.9	8	13.4	13.4
Knoxville	15	7.2	3	64	3.9	1	12.5	14.0
White	12	-------	2	48	-------	1	-------	-------
Colored	3	(6)	1	204	(6)	0	(6)	(6)
Long Beach	24	8.2	0	0	9.4	3	9.9	10.0
Los Angeles	185	7.3	17	49	7.9	10	10.8	11.2
Louisville	70	11.8	8	69	9.7	3	14.6	13.9
White	51	-------	5	49	-------	3	-------	-------
Colored	19	(6)	3	199	(6)	0	(6)	(6)
Lowell [7]	20	10.4	1	25	10.4	4	12.7	13.8
Lynn	11	5.6	1	26	6.6	1	9.8	10.7
Memphis	87	17.5	12	127	12.1	5	16.7	17.7
White	46	-------	7	117	-------	2	-------	-------
Colored	41	(6)	5	145	(6)	3	(6)	(6)
Miami	11	5.1	0	0	14.1	2	12.0	11.4
White	8	-------	0	0	-------	2	-------	-------
Colored	3	(6)	0	0	(6)	0	(6)	(6)
Milwaukee	92	8.1	10	43	9.1	14	9.6	9.8
Minneapolis	64	7.0	6	39	10.3	6	11.5	10.7
Nashville	30	10.1	3	45	12.9	6	17.0	16.9
White	15	-------	2	40	-------	5	-------	-------
Colored	15	(6)	1	59	(6)	1	(6)	(6)
New Bedford [7]	21	9.7	2	53	6.5	2	12.5	11.1
New Haven	32	10.3	0	0	8.7	1	12.5	13.2
New Orleans	152	17.0	12	66	15.3	6	17.3	17.7
White	87	-------	7	58	-------	4	-------	-------
Colored	65	(6)	5	81	(6)	2	(6)	(6)
New York	1,219	9.0	112	47	9.2	99	11.5	11.1
Bronx Borough	163	6.4	19	43	7.6	6	8.4	8.1
Brooklyn Borough	410	8.1	42	45	7.8	36	10.6	10.1
Manhattan Borough	481	13.8	38	65	13.3	41	17.5	16.5
Queens Borough	123	5.6	10	27	6.0	13	7.4	7.2
Richmond Borough	42	13.4	3	54	18.0	3	14.0	14.7
Newark, N. J.	83	9.7	9	47	10.4	5	11.9	12.3
Oakland	41	7.3	3	38	9.3	2	10.6	11.1
Oklahoma City	48	12.7	12	165	10.0	4	11.2	10.7
Omaha	41	9.9	1	11	11.2	4	14.1	13.9
Paterson	28	10.5	2	34	13.9	5	13.7	12.6
Peoria	20	9.6	1	26	7.9	3	12.8	12.7
Philadelphia	370	9.8	28	41	10.7	45	13.5	12.8
Pittsburgh	165	12.7	16	55	10.4	16	14.9	14.0
Portland, Oreg.	55	9.3	3	36	8.6	2	11.7	12.4
Providence	66	13.5	11	101	10.1	5	13.1	13.3
Richmond	49	13.9	5	73	13.4	6	16.0	15.3
White	34	-------	4	88	-------	2	-------	-------
Colored	15	(6)	1	43	(6)	4	(6)	(6)
Rochester	68	10.7	9	82	11.7	7	12.1	11.8
St. Louis	189	11.9	10	34	11.6	12	15.7	14.6
St. Paul	47	8.9	2	21	9.8	2	11.0	10.2
Salt Lake City [5]	32	11.7	4	60	9.6	5	12.3	12.7
San Antonio	58	12.6	10	-------	11.8	9	14.9	17.3
San Diego	38	12.7	3	61	15.0	3	13.8	14.6

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended September 5, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Sept 5, 1931				Corresponding week, 1930		Death rate for the first 36 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
San Francisco	139	11.2	4	27	14 5	8	13.2	13.1
Schenectady	19	10.3	2	59	10 9	0	10.8	11.5
Seattle	75	10 5	1	9	9 1	3	11.6	11.1
Somerville	13	6.4	1	37	6 0	3	9.2	10.0
South Bend	8	3.9	0	0	7.5	4	8.1	9.0
Spokane	20	9 0	1	26	13.1	1	12.3	12.4
Springfield, Mass	32	11.0	3	46	7 6	1	12.0	12.4
Syracuse	41	10.0	4	47	9.9	3	11.8	11 8
Tacoma	19	9.2	1	26	9 3	1	12.1	12.8
Toledo	59	10 4	2	18	10 5	5	12.2	12.8
Trenton	31	13 1	2	35	14.8	4	16 8	17.0
Utica	16	8.2	0	0	11.3	3	14.2	15.1
Washington, D. C	112	11 8	4	22	14 0	13	16.1	15.5
White	71		2	16		7		
Colored	41	(6)	2	34	(6)	6	(6)	(6)
Waterbury	19	9.8	2	60	6.8	2	9.8	10 1
Wilmington, Del.[7]	24	11.7	2	43	12.7	4	14.2	14.6
Worcester	38	10.0	2	27	11.2	4	12.4	13.2
Yonkers	24	9 0	2	52	9.2	3	8.9	8.3
Youngstown	25	7.5	0	0	10.4	3	10.4	10.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930, decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended September 12, 1931, and September 13, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 12, 1931, and September 13, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930
New England States:								
Maine	3	1		1	9	15	0	0
New Hampshire		2		5			0	0
Vermont	1	1			4		0	0
Massachusetts	33	40	12	1	18	30	1	0
Rhode Island		4	1		6	1	0	1
Connecticut	8	7	3	1	2	4	0	1
Middle Atlantic States:								
New York	56	48	[1] 4	[1] 6	48	53	10	13
New Jersey	12	35	1	1	7	15	1	1
Pennsylvania	68	94			64	81	1	5
East North Central States:								
Ohio	73	31	15	14	12	12	1	6
Indiana	15	11	13		6	2	1	4
Illinois	45	88	51	3	25	7	4	4
Michigan	15	38		2	7	6	2	6
Wisconsin	12	8	4	12	27	27	0	3
West North Central States:								
Minnesota	8	13		1	7	2	1	0
Iowa	5	2			2	2	1	1
Missouri	25	19	3	3	3	7	5	5
North Dakota	1	6			5		0	0
South Dakota	1	25			2	1	1	0
Nebraska	9	2	2			1	0	0
Kansas	11	15	2	1	5	9	0	1
South Atlantic States:								
Delaware		4				2	0	0
Maryland [2]	15	12	3	5	9	3	1	1
District of Columbia	7	10			1	2	2	0
Virginia								
West Virginia	13	14	9	4	6	6	1	0
North Carolina	79	118	2	24	6	5	1	2
South Carolina	16	41	121	177	7		0	2
Georgia [3]	55	23	28	21	7	6	1	1
Florida	5	8	1		2		0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever: 1931, 5 cases in Georgia.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 12, 1931, and September 13, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930
East South Central States:								
Kentucky	39	-------	-------	-------	11	-------	1	0
Tennessee	74	12	23	-------	1	7	2	2
Alabama	72	27	3	6	20	2	1	1
Mississippi	99	18	-------	-------	-------	-------	1	0
West South Central States.								
Arkansas	20	1	-------	-------	2	-------	2	1
Louisiana	31	12	8	9	1	3	1	0
Oklahoma [4]	43	16	3	11	2	1	0	3
Texas	21	25	1	30	-------	1	0	1
Mountain States:								
Montana	8	-------	-------	-------	6	2	0	1
Idaho	1	-------	-------	-------	-------	2	0	0
Wyoming	-------	-------	-------	-------	2	1	0	2
Colorado	5	6	-------	-------	-------	3	0	1
New Mexico	2	5	-------	-------	1	1	1	0
Arizona	3	2	3	3	2	-------	0	1
Utah [2]	-------	-------	2	2	1	2	0	0
Pacific States:								
Washington	3	6	-------	-------	2	10	2	0
Oregon	1	4	7	8	5	11	0	0
California	29	24	15	13	39	47	3	5

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930
New England States:								
Maine	2	10	4	4	0	0	3	2
New Hampshire	6	1	2	3	0	0	1	0
Vermont	12	0	1	2	1	0	0	0
Massachusetts	127	21	73	55	0	0	3	14
Rhode Island	21	1	12	4	0	0	2	3
Connecticut	92	0	3	14	0	0	7	12
Middle Atlantic States:								
New York	430	60	95	72	0	0	42	66
New Jersey	94	3	18	23	0	0	21	21
Pennsylvania	14	8	71	83	0	0	37	103
East North Central States:								
Ohio	23	65	172	85	4	31	67	79
Indiana	4	13	44	25	20	13	22	11
Illinois	39	36	94	75	7	13	23	41
Michigan	114	10	61	79	6	0	36	20
Wisconsin	83	8	19	22	1	4	4	7
West North Central States:								
Minnesota	48	28	24	23	1	0	7	4
Iowa	5	20	11	2	8	11	2	0
Missouri	2	12	6	18	3	0	29	28
North Dakota	5	1	0	7	1	0	-------	11
South Dakota	1	7	3	10	2	3	1	0
Nebraska	1	17	6	14	3	14	2	4
Kansas	1	71	16	39	0	2	8	13
South Atlantic States:								
Delaware	0	0	3	4	0	0	3	12
Maryland [2]	1	0	17	11	0	0	35	58
District of Columbia	0	0	5	3	0	0	5	5
Virginia	2	-------	-------	-------	-------	-------	-------	-------
West Virginia	5	3	11	22	0	3	47	54
North Carolina	3	5	58	47	0	0	32	17
South Carolina	0	1	8	19	0	0	67	60
Georgia [3]	1	1	25	22	0	0	78	46
Florida	0	0	0	3	0	0	0	1

[2] Week ended Friday.
[3] Typhus fever: 1931, 5 cases in Georgia.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 12, 1931, and September 13, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930	Week ended Sept. 12, 1931	Week ended Sept. 13, 1930
East South Central States:								
Kentucky	1	1	35	14	0	1	56	31
Tennessee	5	2	25	22	1	1	87	41
Alabama	4	0	45	22	0	0	39	22
Mississippi	1	1	25	11	3	1	37	22
West South Central States:								
Arkansas	0	2	17	0	1	0	37	27
Louisiana	0	7	10	5	3	0	61	19
Oklahoma [4]	0	12	14	17	5	9	47	39
Texas	1	2	22	4	6	12	35	13
Mountain States:								
Montana	3	0	3	15	0	0	8	4
Idaho	0	0	2	5	1	0	1	2
Wyoming	0	2	1	2	1	0	5	0
Colorado	0	1	10	6	0	0	4	14
New Mexico	1	0	1	1	0	0	3	13
Arizona	0	0	3	7	0	0	3	5
Utah [2]	0	0	3	3	0	0	1	3
Pacific States:								
Washington	1	2	12	29	2	12	11	5
Oregon	0	1	4	4	4	0	11	9
California	7	56	32	37	1	11	16	17

[2] Week ended Friday.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July, 1931										
Mississippi	1	45	169	4,807	55	1,329	10	18	60	265
August, 1931										
Alabama	17	112	18	396	64	122	4	85	4	255
Arkansas	3	58	5	266	5	199	1	8	18	206
Connecticut	3	20	7		72		417	39	0	17
District of Columbia	1	24	3		8	3	3	16	0	6
Indiana	15	52	23	2	54	1	10	80	61	67
New Jersey	11	64	6	1	98		354	117	0	37
North Dakota	4	17	2		31		3	14	20	43
Ohio	8	101	26	3	162		42	351	18	179
South Carolina		72	435	2,307	52	539	4	21	0	385
Tennessee	13	57	41	250	36	56	6	94	20	514

July, 1931

Mississippi:	Cases
Anthrax	1
Chicken pox	193
Dengue	2
Dysentery (amebic)	105
Hookworm disease	246
Mumps	75
Ophthalmia neonatorum	12
Puerperal septicemia	26
Rabies in animals	9
Trachoma	3
Whooping cough	837

August, 1931

Chicken pox:	Cases
Alabama	19
Arkansas	2
Connecticut	31
District of Columbia	10
Indiana	11
New Jersey	35
North Dakota	12
Ohio	58
Tennessee	12
Dengue:	
South Carolina	24

	Cases
Dysentery:	
New Jersey	3
Ohio	5
Tennessee	37
Food poisoning:	
Ohio	10
German measles:	
Connecticut	5
New Jersey	10
Ohio	12
Tennessee	10
Hookworm disease:	
South Carolina	126
Tennessee	1
Impetigo contagiosa:	
Tennessee	5
Lead poisoning:	
Connecticut	1
New Jersey	1
Ohio	7
Lethargic encephalitis:	
Alabama	4
Connecticut	5
District of Columbia	2
New Jersey	1
North Dakota	2
Ohio	3
South Carolina	2
Tennessee	1
Mumps:	
Alabama	15
Arkansas	17
Connecticut	70
Indiana	16
New Jersey	63
North Dakota	22
Ohio	139
South Carolina	25
Tennessee	23
Ophthalmia neonatorum:	
New Jersey	5
Ohio	92
South Carolina	21
Tennessee	4
Paratyphoid fever:	
Arkansas	2
Connecticut	5
New Jersey	3
Ohio	9
South Carolina	25
Tennessee	4
Puerperal septicemia:	
Ohio	3

	Cases
Rabies in animals:	
Connecticut	2
South Carolina	12
Rabies in man:	
Alabama	1
Rocky Mountain spotted or tick fever:	
District of Columbia	2
Tennessee	1
Septic sore throat:	
Connecticut	10
North Dakota	1
Ohio	49
Tennessee	12
Tetanus:	
Connecticut	1
New Jersey	1
North Dakota	1
Ohio	1
Tennessee	4
Trachoma:	
Arkansas	5
Indiana	1
New Jersey	2
North Dakota	1
Ohio	8
Trichinosis:	
New Jersey	1
Typhus fever:	
Alabama	12
South Carolina	4
Undulant fever:	
Alabama	3
Connecticut	1
District of Columbia	1
Indiana	1
New Jersey	3
Ohio	12
Tennessee	2
Vincent's angina:	
North Dakota	35
Whooping cough:	
Alabama	62
Arkansas	36
Connecticut	289
District of Columbia	81
Indiana	171
New Jersey	1,260
North Dakota	121
Ohio	772
South Carolina	170
Tennessee	254

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of June, 1931, by departments of health of certain States to other State health departments

Disease	California	Connecticut	Illinois	Kansas	Minnesota	New York	Washington
Gonorrhea					1		
Measles		1				2	
Scarlet fever			1		1	1	
Smallpox			2		1		
Syphilis				3	3		1
Trachoma					1		
Tuberculosis	2		1		33		
Typhoid fever	2					2	

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,170,000. The estimated population of the 90 cities reporting deaths is more than 31,660,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended September 5, 1931, and September 6, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	841	770	
96 cities	234	252	376
Measles:			
45 States	431	414	
96 cities	122	151	
Meningococcus meningitis:			
46 States	56	72	
96 cities	19	24	
Poliomyelitis:			
46 States	1,369	422	
Scarlet fever:			
46 States	1,012	946	
96 cities	306	264	251
Smallpox:			
46 States	79	175	
96 cities	9	19	5
Typhoid fever:			
46 States	953	1,072	
96 cities	126	130	164
Deaths reported			
Influenza and pneumonia:			
90 cities	315	336	
Smallpox:			
90 cities	0	0	

City reports for week ended September 5, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	0	----------	0	0	0	1
New Hampshire:								
Concord	0	0	0	----------	0	0	0	0
Nashua	0	0	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Massachusetts:								
Boston	3	13	16	2	1	7	0	3
Fall River	1	1	2	1	0	3	0	1
Springfield	0	0	0	----------	0	2	3	0
Worcester	0	2	1	----------	0	0	0	1
Rhode Island:								
Pawtucket	0	0	0	----------	0	0	0	1
Providence	1	2	1	----------	0	11	2	1
Connecticut:								
Bridgeport	1	2	2	----------	0	1	0	1
Hartford	0	1	1	----------	0	0	0	0
New Haven	0	1	0	----------	0	0	0	1
MIDDLE ATLANTIC								
New York:								
Buffalo	0	7	3	----------	0	0	2	6
New York	14	71	44	4	2	17	12	88
Rochester	1	2	0	----------	0	3	4	2
Syracuse	0	1	0	----------	0	0	0	1
New Jersey:								
Camden	0	1	0	----------	0	0	0	0
Newark	3	7	3	----------	0	0	3	8
Trenton	0	1	0	----------	0	0	0	3
Pennsylvania:								
Philadelphia	5	25	1	----------	0	7	1	20
Pittsburgh	0	8	2	1	0	4	1	11
Reading	0	1	1	----------	0	0	1	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	2	3	6	----------	0	0	0	5
Cleveland	9	17	2	4	0	1	9	9
Columbus	0	2	5	1	1	0	3	0
Toledo	0	3	4	----------	0	0	0	2
Indiana:								
Fort Wayne	0	1	2	----------	0	1	0	1
Indianapolis	0	2	1	----------	0	1	1	1
South Bend	0	1	0	----------	0	0	0	0
Terre Haute	0	0	0	----------	0	0	0	1
Illinois:								
Chicago	8	47	36	3	0	8	6	19
Springfield	0	0	1	----------	0	0	0	1
Michigan:								
Detroit	6	23	9	----------	0	0	0	11
Flint	0	1	0	----------	0	0	0	0
Grand Rapids	0	1	0	----------	0	2	1	0
Wisconsin:								
Kenosha	0	0	0	----------	0	0	2	0
Madison	1	1	1	----------	----------	0	2	----------
Milwaukee	9	5	1	----------	0	4	6	5
Racine	0	0	0	----------	0	1	6	1
Superior	0	0	0	----------	0	0	0	0

City reports for week ended September 5, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL								
Minnesota:								
Duluth	2	0	0		0	0	0	0
Minneapolis	0	10	2		0	0	2	5
St. Paul		4						
Iowa:								
Davenport	1	0	0			0	0	
Des Moines	0	0	0			0	0	
Sioux City	0	0	1			0	2	
Waterloo	0	0	0			1	1	
Missouri:								
Kansas City	0	1	2		0	3	0	3
St. Joseph	0	0	0		0	0	0	1
St. Louis	0	14	4			0	3	10
North Dakota:								
Fargo	0	0	0		0	0	0	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	2	0	0			0	1	
Nebraska:								
Omaha	0	3	3		0	0	0	0
Kansas:								
Topeka	1	0	0	1	1	0	1	1
Wichita	0	0	0		0	0	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	0	0		0	0	2	2
Maryland:								
Baltimore	3	12	6		1	1	1	12
Cumberland	0	0	0		0	0	0	1
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	0	7	0		0	1	0	2
Virginia:								
Lynchburg	0	1	2		0	1	0	1
Norfolk	2	0	0		0	0	0	0
Richmond	0	8	1		0	0	0	2
Roanoke	0	2	2		0	0	0	0
West Virginia:								
Charleston	0	1	2		0	0	0	0
Wheeling	0	0	0		0	0	0	2
North Carolina:								
Raleigh	1	1	0		0	1	0	0
Wilmington	0	1	0		0	0	0	0
Winston-Salem	0	2	1		0	0	1	1
South Carolina:								
Charleston	0	0	0	3	0	0	0	0
Columbia	0	0	0		0	0	0	1
Greenville	0	1	0		0	0	0	0
Georgia:								
Atlanta	0	2	3	1	0	0	0	5
Brunswick	0	0	0		0	0	0	0
Savannah	0	0	0	10	0	0	2	1
Florida:								
Miami	0	1	0		0	0	0	0
Tampa	0	1	0		0	0	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	0	0	2
Tennessee:								
Memphis	1	1	6		0	0	1	3
Nashville	0	1	4		0	0	0	0
Alabama:								
Birmingham	0	3	1		1	1	1	1
Mobile	0	0	1		0	0	0	0
Montgomery	0	1	2	1		0	0	

City reports for week ended September 5, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith		0						
Little Rock	0	0	0		1	0	0	2
Louisiana:								
New Orleans	0	6	11	2	2	0	0	7
Shreveport	0	0	2		0	0	1	0
Oklahoma:								
Muskogee	0	0	0		0	0	0	0
Oklahoma City	1	1	0		1	0	0	3
Tulsa	0	0	4			0	0	
Texas:								
Dallas	0	5	5		0	0	0	1
Fort Worth	0	2	0		0	0	0	0
Galveston	0	0	0		0	0	0	4
Houston	0	3	7		0	0	0	7
San Antonio	0	2	6		0	0	0	3
MOUNTAIN								
Montana:								
Billings	0	0	0		0	3	0	0
Great Falls	1	0	0		0	2	0	0
Helena	0	0	0		0	0	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	0	0	0
Colorado:								
Denver	0	7	6		0	1	2	7
Pueblo	0	1	0		0	0	0	2
New Mexico:								
Albuquerque	0	1	0		0	0	0	0
Arizona:								
Phoenix	0	1	0	0	0	0	0	1
Utah:								
Salt Lake City	3	2	0		0	0	0	2
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	2	2	0			4	0	
Spokane	0	1	0			0	0	
Tacoma	0	1	0		0	1	0	0
Oregon:								
Portland	0	4	0		0	1	2	0
Salem	0	0	0	2	0	0	0	0
California:								
Los Angeles	4	18	8	13	0	6	5	2
Sacramento	0	1	6		0	3	1	1
San Francisco	1	6	0	1	1	20	0	5

City reports for week ended September 5, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	1	0	0	0	0	0	1	0	0	2	19
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	8
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	5
Massachusetts:											
Boston	14	10	0	0	0	9	3	1	0	37	173
Fall River	1	3	0	0	0	2	0	0	0	2	18
Springfield	1	6	0	0	0	3	0	0	0	5	31
Worcester	2	6	0	0	0	0	0	0	0	8	38
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	15
Providence	2	9	0	0	0	4	1	2	1	8	66
Connecticut:											
Bridgeport	1	1	0	0	0	1	0	0	0	4	35
Hartford	1	0	0	0	0	1	0	0	0	9	40
New Haven	1	1	0	0	0	0	2	0	0	1	32
MIDDLE ATLANTIC											
New York:											
Buffalo	5	9	0	0	0	12	1	0	0	14	108
New York	20	16	0	0	0	86	40	22	4	175	1,219
Rochester	1	5	0	0	0	3	1	2	1	11	65
Syracuse	1	6	0	0	0	2	1	0	0	20	41
New Jersey:											
Camden	0	2	0	0	0	2	1	0	0	7	19
Newark	3	6	0	0	0	2	2	0	0	91	85
Trenton	2	6	0	0	0	1	0	0	0	0	31
Pennsylvania:											
Philadelphia	15	26	0	0	0	31	9	4	0	108	370
Pittsburgh	7	6	0	0	0	10	3	1	1	25	165
Reading	0	0	0	0	0	0	0	0	0	4	23
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	17	0	0	0	10	3	3	0	5	122
Cleveland	11	17	0	2	0	13	4	0	0	75	169
Columbus	2	2	0	0	0	3	0	3	1	1	60
Toledo	2	0	0	0	0	5	2	2	0	12	59
Indiana:											
Fort Wayne	1	1	0	0	0	1	1	0	0	1	17
Indianapolis	2	1	0	1	0	5	1	0	0	7	-------
South Bend	1	1	0	0	0	0	0	0	0	0	8
Terre Haute	1	0	0	0	0	0	0	1	0	3	22
Illinois:											
Chicago	25	29	0	0	0	36	5	4	0	155	556
Springfield	1	2	0	0	0	1	0	0	0	0	13
Michigan:											
Detroit	20	15	0	0	0	19	4	9	1	126	211
Flint	4	4	1	3	0	1	0	5	0	3	11
Grand Rapids	3	2	0	0	0	2	0	0	0	3	38
Wisconsin:											
Kenosha	0	0	0	0	0	0	0	0	0	1	4
Madison	0	0	1	0	-------	-------	0	0	-------	0	-------
Milwaukee	6	1	0	0	0	5	1	2	0	40	92
Racine	1	0	0	0	0	1	0	0	0	6	10
Superior	1	0	0	0	0	0	0	0	0	0	9
WEST NORTH CENTRAL											
Minnesota:											
Duluth	3	0	0	0	0	0	0	0	0	7	18
Minneapolis	11	1	0	0	0	3	1	0	0	1	64
St. Paul	6	-------	0	-------	-------	-------	1	-------	-------	-------	-------
Iowa:											
Davenport	1	2	0	0	-------	-------	0	0	-------	0	-------
Des Moines	2	1	0	0	-------	-------	0	0	-------	0	37
Sioux City	0	0	0	0	-------	-------	0	0	-------	2	-------
Waterloo	0	0	0	0	-------	-------	0	0	-------	3	-------

City reports for week ended September 5, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—con.											
Missouri:											
Kansas City	3	2	0	1	0	3	2	0	0	4	73
St. Joseph	1	0	0	0	0	0	0	1	0	0	13
St. Louis	10	8	0	0	0	15	6	2	0	30	189
North Dakota:											
Fargo	1	0	0	0	0	0	0	0	0	6	--------
Grand Forks	0	0	0	0	--------	--------	0	1	--------	0	--------
South Dakota:											
Aberdeen	1	0	0	0	--------	--------	0	0	--------	0	--------
Nebraska:											
Omaha	1	2	0	1	0	2	0	0	0	2	41
Kansas:											
Topeka	1	1	0	0	0	0	0	0	0	0	9
Wichita	1	0	0	0	0	0	2	0	0	0	25
SOUTH ATLANTIC											
Delaware.											
Wilmington	0	0	0	0	0	1	1	1	0	0	24
Maryland:											
Baltimore	5	2	0	0	0	10	8	8	1	73	182
Cumberland	0	1	0	0	0	1	1	1	1	0	11
Frederick	0	0	0	0	0	0	1	0	0	0	3
Dist. of Columbia:											
Washington	4	2	0	0	0	9	3	1	1	15	112
Virginia:											
Lynchburg	0	3	0	0	0	0	1	2	0	0	9
Norfolk	0	6	0	0	0	0	2	1	1	2	--------
Richmond	3	8	0	0	0	3	2	2	0	1	47
Roanoke	1	0	0	0	0	1	0	0	1	1	15
West Virginia:											
Charleston	1	0	0	0	0	3	2	1	0	0	30
Wheeling	1	1	0	0	0	0	1	1	0	0	8
North Carolina:											
Raleigh	0	0	0	0	0	2	0	0	0	2	11
Wilmington	0	0	0	0	0	1	0	0	0	1	8
Winston-Salem	1	3	0	0	0	1	1	0	0	10	13
South Carolina:											
Charleston	0	0	0	0	0	0	3	1	0	0	19
Columbia	0	0	0	0	0	2	1	0	0	0	22
Greenville	0	1	1	0	0	0	0	0	0	0	--------
Georgia:											
Atlanta	4	5	0	0	0	5	4	5	0	2	73
Brunswick	0	0	0	0	0	0	0	0	0	0	1
Savannah	0	1	0	0	0	2	1	2	0	0	24
Florida:											
Miami	0	0	0	0	0	0	0	0	0	0	11
Tampa	1	0	0	0	0	3	1	0	0	0	23
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	4	0	0	0	0	0	0	0	0	27
Tennessee:											
Memphis	1	4	0	0	0	8	8	4	1	14	87
Nashville	1	0	--------	0	0	1	6	2	1	0	30
Alabama:											
Birmingham	4	2	0	0	0	5	4	1	0	0	72
Mobile	0	2	0	0	0	1	1	0	1	0	19
Montgomery	0	3	0	0	--------	--------	0	0	--------	0	--------

City reports for week ended September 5, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0		0				0				
Little Rock	0	0	0	0	0	1	2	0	1	0	6
Louisiana:											
New Orleans	2	8	0	0	0	15	4	5	2	3	152
Shreveport	0	2	0	0	0	0	1	0	1	6	30
Oklahoma:											
Muskogee	0	0	0	0	0	0	0	1	1	0	
Oklahoma City	1	2	0	1	0	0	3	3	0	0	48
Tulsa	0	2	0	1			1	0		2	
Texas:											
Dallas	2	4	0	0	0	3	2	4	3	6	41
Fort Worth	1	2	0	1	0	0	1	1	0	0	
Galveston	0	0	0	0	0	1	0	0	0	0	18
Houston	1	1	0	0	0	4	1	12	1	0	71
San Antonio	2	1	0	0	0	11	1	1	1	0	58
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	2	8
Great Falls	0	0	0	0	0	0	0	0	0	0	13
Helena	0	0	0	0	0	0	0	0	0	0	
Missoula	0	0	0	0	0	0	0	0	0	0	2
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	5
Colorado:											
Denver	3	1	0	0	0	5	1	3	0	14	75
Pueblo	0	0	0	0	0	1	0	0	0	0	10
New Mexico:											
Albuquerque	0	0	0	0	0	2	1	1	0	0	5
Arizona:											
Phoenix	0	0	0	0	0	1	0	0	1	0	
Utah:											
Salt Lake City	2	2	0	0	0	0	2	2	0	4	32
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	1
PACIFIC											
Washington:											
Seattle	3	7	0	1			2	1		15	
Spokane	2	0	1	0			0	0		0	
Tacoma	1	1	1	0	0	0	0	0	0	6	19
Oregon:											
Portland	2	1	3	5	0	1	0	1	0	1	55
Salem	0	0	0	0	0	0	0	0	0	0	
California:											
Los Angeles	7	8	1	0	0	15	3	1	0	14	185
Sacramento	1	0	0	0	0	2	0	1	0	5	22
San Francisco	5	6	1	0	0	9	0	2	0	13	146

City reports for week ended September 5, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	1	0	0	0	0	0	0	1
New Hampshire:									
Concord	0	0	0	0	0	0	0	1	0
Nashua	0	0	0	0	0	0	0	2	0
Massachusetts:									
Boston [1]	0	0	1	2	0	0	4	46	2
Fall River	0	0	0	0	0	0	0	1	0
Springfield	0	0	0	0	0	0	0	10	0
Worcester	0	0	0	0	0	0	0	4	0
Rhode Island:									
Providence	0	0	0	0	0	0	0	17	0
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	2	0
Hartford	0	0	0	1	0	0	0	30	1
New Haven	0	0	0	0	0	0	0	18	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	0	0	2	1	0
New York	5	3	0	2	0	0	11	347	38
Rochester	0	0	0	0	0	0	0	2	0
New Jersey:									
Newark	1	0	0	0	0	0	1	7	0
Pennsylvania:									
Philadelphia	0	2	0	0	1	1	1	6	1
Pittsburgh	0	0	0	2	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Cleveland	1	0	0	0	0	1	2	7	0
Toledo	0	0	0	0	0	0	0	0	1
Indiana:									
Fort Wayne	0	0	0	0	0	0	0	1	0
Illinois: [1]									
Chicago	2	2	0	0	0	0	3	5	0
Michigan:									
Detroit	0	0	2	0	0	0	2	17	1
Flint	0	0	0	0	0	0	0	1	0
Grand Rapids	0	0	0	0	0	0	0	4	0
Wisconsin:									
Madison	0	0	0	0	0	0	0	9	0
Milwaukee	0	0	0	0	0	0	0	5	0
Superior	0	0	0	0	0	0	0	2	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	8	0
Minneapolis	1	1	0	0	0	0	0	5	0
Iowa:									
Des Moines	0	0	0	0	0	0	0	1	0
Missouri:									
St. Louis	2	1	0	0	0	0	1	2	0
Nebraska:									
Omaha	0	0	0	0	0	0	1	1	0

[1] Typhus fever, 8 cases: 1 case at Boston, Mass.; 1 case at Springfield, Ill.; 1 case at Norfolk, Va.; 4 cases at Savannah, Ga.; and 1 case at Fort Worth, Tex.

City reports for week ended September 5, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	1	1	0	0	1	0	1
Virginia:									
Norfolk [1]	0	0	0	0	0	0	0	2	1
West Virginia:									
Charleston	1	0	0	0	0	0	0	0	0
Wheeling	0	0	0	0	0	0	0	2	0
North Carolina:									
Wilmington	0	0	0	0	0	0	0	1	0
South Carolina:									
Columbia	0	0	0	0	0	3	0	0	0
Georgia:									
Atlanta	0	0	0	0	2	2	1	0	0
Savannah [1]	0	0	0	0	1	1	0	0	0
Florida:									
Miami	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	1	0	0	2	1	0	2	0
Nashville	0	0	0	0	1	0	1	0	0
Alabama:									
Birmingham	1	1	0	0	1	1	1	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	1	0
Louisiana:									
New Orleans	1	1	0	0	1	1	0	0	0
Texas:									
Dallas	0	0	0	0	0	1	0	0	0
Fort Worth [1]	0	0	0	0	0	0	1	1	0
MOUNTAIN									
Arizona:									
Phoenix	0	0	0	1	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	0	0	0
Oregon:									
Portland	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	2	0	0	0	1	0	2	5	0
San Francisco	0	0	1	0	2	0	0	0	0

[1] Typhus fever, 8 cases: 1 case at Boston, Mass.; 1 case at Springfield, Ill.; 1 case at Norfolk, Va.; 4 cases at Savannah, Ga.; and 1 case at Fort Worth, Tex.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended September 5, 1931, compared with those for a like period ended September 6, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, Aug. 2 to Sept. 5, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Aug 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug. 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930
98 cities	31	37	[2] 32	31	[2] 30	33	[2] 31	38	[3] 37	40
New England	65	34	41	44	67	44	41	53	55	39
Middle Atlantic	26	32	26	22	19	27	18	29	24	29
East North Central	31	48	[2] 30	36	[2] 28	40	[2] 33	45	38	48
West North Central	29	29	36	27	31	25	36	27	[4] 26	35
South Atlantic	26	18	43	38	24	40	63	64	34	66
East South Central	41	18	17	30	35	12	52	12	81	48
West South Central	64	49	47	49	68	63	34	66	[5] 107	56
Mountain	26	18	78	18	44	44	17	70	52	44
Pacific	18	57	31	30	35	22	24	16	27	32

MEASLES CASE RATES

	Aug 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug. 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930
98 cities	60	49	[2] 39	32	[2] 29	28	[2] 22	20	[3] 19	24
New England	135	99	79	65	63	65	63	22	58	36
Middle Atlantic	57	61	32	39	25	31	13	22	14	27
East North Central	87	27	[2] 61	19	[2] 37	21	[2] 23	7	11	12
West North Central	15	52	11	31	13	19	8	27	[4] 9	31
South Atlantic	34	24	10	24	20	20	4	32	8	28
East South Central	12	18	23	18	23	6	6	12	6	24
West South Central	3	10	0	7	7	0	24	10	[5] 0	0
Mountain	70	115	61	44	70	26	52	35	52	53
Pacific	43	63	49	43	22	40	53	30	67	34

SCARLET FEVER CASE RATES

	Aug 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug. 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930
98 cities	46	31	[2] 33	30	[2] 43	32	[2] 41	41	[3] 48	42
New England	43	46	53	56	99	51	46	56	87	60
Middle Atlantic	51	20	31	17	38	25	30	26	37	24
East North Central	60	45	[2] 48	39	[2] 57	35	[2] 43	47	56	47
West North Central	19	27	23	29	19	35	31	43	[4] 80	58
South Atlantic	38	20	22	28	36	30	30	72	51	72
East South Central	41	12	41	48	17	30	70	102	87	60
West South Central	41	35	17	31	27	35	64	14	[5] 55	63
Mountain	61	70	26	44	44	88	165	88	26	35
Pacific	22	38	10	32	31	28	39	26	43	28

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] Terre Haute, Ind., not included.
[3] St. Paul, Minn., and Fort Smith, Ark., not included.
[4] St. Paul, Minn., not included.
[5] Fort Smith, Ark., not included.

Summary of weekly reports from cities, Aug. 2 to Sept. 5, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Con.

SMALLPOX CASE RATES

	Week ended—									
	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930
98 cities	3	3	[2] 1	3	[2] 1	2	[2] 1	2	[3] 1	3
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	2	6	[2] 1	3	[2] 0	0	[2] 0	0	4	2
West North Central	13	6	8	6	6	8	4	8	[4] 4	14
South Atlantic	2	2	2	0	4	2	4	0	0	4
East South Central	0	0	0	6	0	0	0	0	0	0
West South Central	0	7	0	3	0	7	0	3	[5] 0	0
Mountain	9	0	9	0	0	0	0	0	0	0
Pacific	14	4	2	12	4	10	4	10	2	12

TYPHOID FEVER CASE RATES

	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930
98 cities	22	17	[2] 21	20	[2] 21	19	[2] 22	24	[3] 20	21
New England	14	5	26	5	5	17	22	12	7	12
Middle Atlantic	16	10	14	14	14	13	20	20	13	20
East North Central	10	11	[2] 7	10	[2] 11	9	[2] 10	10	16	12
West North Central	19	19	13	29	19	21	13	19	[4] 6	14
South Atlantic	53	66	77	44	55	60	38	88	49	58
East South Central	29	60	70	132	70	78	47	42	41	48
West South Central	95	14	45	42	91	24	98	66	[5] 76	45
Mountain	44	35	44	26	9	26	9	44	44	9
Pacific	14	10	12	12	8	6	12	8	10	8

INFLUENZA DEATH RATES

	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930
91 cities	2	3	[2] 3	1	[2] 2	3	[2] 2	4	[4] 2	3
New England	2	0	0	0	2	0	0	0	2	0
Middle Atlantic	3	2	3	2	2	3	2	3	1	3
East North Central	1	1	[2] 2	0	[2] 2	1	[2] 1	4	1	2
West North Central	0	3	3	3	3	0	3	3	[4] 3	6
South Atlantic	0	10	4	0	6	8	6	8	2	8
East South Central	13	0	6	0	0	0	13	6	6	0
West South Central	3	0	7	0	0	4	0	7	10	11
Mountain	0	18	17	0	0	9	0	0	0	9
Pacific	5	5	2	0	7	7	2	2	2	0

PNEUMONIA DEATH RATES

	Aug. 8, 1931	Aug. 9, 1930	Aug. 15, 1931	Aug. 16, 1930	Aug 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930
91 cities	48	52	[2] 45	53	[2] 48	45	[2] 48	52	[4] 50	53
New England	34	46	29	41	36	56	46	51	24	56
Middle Atlantic	52	56	56	68	56	53	60	57	62	65
East North Central	35	47	[2] 37	27	[2] 32	27	[2] 26	50	33	36
West North Central	56	45	44	27	44	36	50	39	[4] 73	51
South Atlantic	79	72	57	74	63	52	69	60	61	63
East South Central	63	45	50	52	57	65	57	45	38	91
West South Central	62	53	52	85	59	57	59	36	83	50
Mountain	44	70	44	123	44	53	61	53	96	53
Pacific	38	35	14	40	53	40	29	45	19	27

[2] Terre Haute, Ind., not included.
[3] St. Paul, Minn., and Fort Smith, Ark., not included.
[4] St. Paul, Minn., not included.
[5] Fort Smith, Ark., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended August 29, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended August 29, 1931, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia						1
New Brunswick				1		3
Quebec				50		21
Ontario	2			11		42
Manitoba						2
Saskatchewan		50	3		8	2
Alberta				1		3
British Columbia	1			5		1
Total	3	50	3	68	8	75

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended August 29, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended August 29, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	3	Poliomyelitis	50
Diphtheria	25	Scarlet fever	26
Erysipelas	3	Tuberculosis	38
Measles	6	Typhoid fever	21
Mumps	1	Whooping cough	30

CUBA

Provinces—Communicable diseases—Four weeks ended August 1, 1931.—During the four weeks ended August 1, 1931, cases of certain communicable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer					1	4	5
Chicken pox		2				29	31
Diphtheria	1	6	1	6	3	2	19
Malaria		9		1	5	45	60
Measles		59	3	22			84
Paratyphoid fever	1	2	3	2		1	9
Scarlet fever		1		2			3
Tetanus (infantile)				3			3
Typhoid fever	1	54	10	32	1	26	124

LATVIA

Communicable diseases—January–June, 1931.—During the six months from January 1 to June 30, 1931, cases of certain communicable diseases were reported in Latvia as follows:

Disease	Month						
	January	February	March	April	May	June	Total
Botulism			1				1
Cerebrospinal meningitis	6	6	5	8	6	3	34
Diphtheria	67	78	69	57	92	44	407
Erysipelas	65	47	40	44	45	28	269
Influenza	1,450	823	390	119	123	26	2,931
Leprosy		3				2	5
Lethargic encephalitis				1	1		2
Malaria		1	1				2
Measles	78	103	150	69	69	39	508
Mumps	43	113	96	80	163	47	542
Poliomyelitis		1	1			1	3
Puerperal fever	17	12	16	15	13	8	81
Scarlet fever	147	120	100	64	84	28	543
Tetanus	1	1	1		1	8	12
Trachoma	112	112	135	94	81	96	630
Typhoid fever	63	44	42	52	56	61	318
Whooping cough	51	49	45	102	58	83	388

MEXICO

Tampico—Communicable diseases—August, 1931.—During the month of August, 1931, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	4		Measles		1
Dysentery	8	2	Paratyphoid fever	2	1
Enteritis (various)		40	Tuberculosis	34	23
Influenza	8	2	Typhoid fever	5	1
Malaria	135	8	Whooping cough	20	

TRINIDAD

Port of Spain—Vital statistics—July, 1930, 1931.—The following statistics for the month of July, 1930 and 1931, are taken from a report issued by the public health department of Port of Spain, Trinidad:

	1930	1931		1930	1931
Number of births	147	153	Deaths under 1 year	14	32
Birth rate per 1,000 population	25.7	26.2	Deaths under 1 year per 1,000 births	95.2	209.2
Number of deaths	80	130			
Death rate per 1,000 population	14.0	22.3			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931				July, 1931				August, 1931					September, 1931	
					6	13	20	27	4	11	18	25	1	8	15	22	29	5	12
Ceylon: Colombo	C	1		1	1								1	1	1				
	D			1	1								1	1	1				
China:																			
Canton	C		1	2			1											1	
	D			1															
Shanghai	C									1				1	5	1	1		
Swatow	C					3	1	6	7										
Tientsin	C			1		2	8												
	D			1			1												
India	C	8,968	11,462	13,604	3,932	4,657	4,687	4,725	4,737	5,002	5,707	6,628							
	D	4,550	5,767	7,270	2,146	2,656	2,704	2,831	2,677	2,848	3,064	3,504							
Bombay	C		2							1	11	11	9	18	6	11	27		
	D		1								6	10	4	9	7	5	9		
Calcutta	C	436	310	265	94	74	50	74	72	62	55	48	42	27	20	21	10		
	D	256	176	149	57	47	26	38	35	34	58	28	10	7	7	6	4		
Karikal	C	12	19	12															
	D	12	14	7															
Madras	C	20	26	52	3	6			2	2			1		2	3	3		
	D	10	13	17		4													
Moulmein	C										1								
	D										1								
Negapatam	D																1		
Rangoon	C			2		2		2		1	2	1		1	1				
	D			1		1		1			1			1	1				
Vizagapatam	C							1											
India (French):																			
Chandernagor	C	7	6	4		1	2		1	1	1	2	1	4	2				
	D	6	5	4		1	2			1			1	4	2				
Pondicherry	C	100	24	17	1	1	1			1	1	1	1		1				
	D	18	4	7	1	1	1			1	1	1	1		1				
India (Portuguese)	C							1		2									
	D									1									

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	pr. 5–ay 2, 1931	May 3–30, 1931	Week ended— June, 1931				July, 1931				August, 1931					September, 1931	
					6	13	20	27	4	11	18	25	1	8	15	22	29	5	12
Indo-China (see also table below):																			
Cochin-China—Rachgia	C												P						
Pnompenh	C		2		1					1	4			1		1			
	D	1	1	2	1					1	1			1					
Saigon and Cholon	C	5	27	104	18	16	14	13	8	3	3								
	D	5	22	76	9	14	9	9	3	2	2								
Iraq:																			
Abulkhasib	C																6		
	D																5		
Amara	C															2	22	35	8
	D															1	21	30	7
Amara Province	C																6	11	106
	D																5	4	67
Basra	C												3	9	263	272	148		54
	D												2	8	140	137	76		30
Basra Province	C															5	14	6	10
	D															2	10	3	7
Muntafiq Province	C																10	21	66
	D																8	20	42
Nasiriyah	C																	22	50
	D																	15	40
Suqelshuyukh	C																2		
	D																2		
Persia: Rafsanjan [1]	C			36															
	D			14															
Philippine Islands: [2] Provinces—																			
Capiz	C	48	29	17	4													9	9
	D	41	24	15	4													5	6
Cebu	C													1	1	1			
	D													1	1	1			
Iloilo	C	7			8	7	5	6	24	3									
	D	4			6	5	6	4	22	3									
Masbate	C	21																	
	D	9																	

Negros, Occidental	C							2											
	D							1											
Pampanga	C			1															
Siam	C	10	16	14		1	3		1	1		1							
	D	2	4	5		1	1			1									
Ayudhaya District	C	1																	
Bangkok	C	3	3	3				1	1			3				1			
	D	2	2	1				1				2							
Bismulok Province	C	8																	
	D	2																	
On vessel:																			
S. S. Arankola at Rangoon from Calcutta	C			1															
S. S. City of Eastborne, at Calcutta from Cocanada	C				1														
S. S. Tairea, at Penang from Calcutta	C					1													
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C											1							
	D											1							
S. S. Kohistan, at Basra from Bushire, Persia	C											2							
S. S. Cathay at Kobe, Japan, from Shanghai	C															4			
	D															1			

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			Aug. 1-10, 1931
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	
Indo-China (French) (see also table above):														
Cambodia [1]	C	125	79	58		44	40	83	96		72	82	87	12
Cochin-China [1]	C	29	105	62	1	52	75	71	69		66	30	47	39

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19
Algeria:																				
Algiers	C	1											2							
	D	1																		
Bone	C					1														
Constantine, vicinity of	C																			
Philippeville	C										1				1	1				
	D										1				1					
Argentina: San Juan Province	C										P	P								
Belgian Congo	C	2					1													
	D	2					1													
British East Africa (see also table below):																				
Tanganyika	C	8	18	46	4	7	5	1			6									
	D	1	21	30	2	4	1	3			6									
Uganda	C	19	35	138		91	106	101	95	132	98	93								
	D	19	32	126		87	100	99	94	129	96	90								
Ceylon: Colombo	C	8	4	3		1		1				1	4	1	1					
	D	7	3	3		1		1				1	4	1	1					
Plague-infected rats		4	1	5									1	3	4					
China: Amoy [1]	C			1																
	D			1																
Dutch East Indies:																				
Batavia and West Java	C	84	74	59	15	25	11	15	21	18	19	17								
	D	80	71	59	15	25	11	15	21	18	19	17								
East Java and Madura	C	4	1	1																
	D	4	1	1																
Java and Madura	D	277	243	176	41	58	48	45	59	55	52	66	38	53						
Egypt:																				
Alexandria	C	1					3	1	1	1	2	9	4	3	1	1		2		1
	D						3	1	1			4	1	2				1		
Assiout	C	13	32	18	4		5	2												
	D	6	17	7				1												
Beni-Suef	C		12	5																
	D		3	3																
Beheira	C												1		1			2		
Cairo	C	1																		

Dakahlia	C										1			2						
Deirout	C		3	10	3															
	D		1	4	1															
Gharbieh	C					1														
	D					1														
Girga	C	86	44	7					1											
	D	24	22	2																
Kena	C	5	3	1																
	D	2	1	1																
Manfalut	C	17																		
	D	3																		
Minieh	C	3	1	6	3				10		2									
	D	2		3	1				2		1	1								
Port Said	C					1	1	1	1	1	2	1	2							
	D			1			1	1	1											
Tanta	C														2			1		
Hawaii Territory:																				
Hawaii—Hamakua—Plague-infected rats				1											1					
Maui Island—Kula District	C													1						
	D													1						
India	C	9,139	6,142	752	39	24	9	16	30	29	78	84								
	D	7,037	5,199	692	25	14	2	10	15	13	42	58								
Bassein	C		1	1					1			3		1		1				
	D		1	1					1			2		1		1				
Bombay	C	4	11	8					1	1	11									
	D	3	11	6							6									
Plague-infected rats		70	137	94	10	10	10	7	11	16	9	12	8	13	17	9	23			
Burma	C										7	9								
	D										5	5								
Calcutta	C		2																	
	D		2																	
Madras Presidency	C	23	3	2		1	5		1	2	8	10					9			
	D	21	2	1		1				1	1	7					4			
Moulmein	C										1						P	5		
	D										1							4		
Rangoon	C	1	1	2		1					2		1							
	D	1	1	2		1					1		1							
Plague-infected rats		7	4	7		3			1	2	2	1	1		1	1	1			
Indo-China (see also table below): Pnompenh	C				1		1													
	D	6	4		1		1													
Iraq:																				
Baghdad	C	8	23	23	10	6	1	6	1	1	1				1			1	1	
	D	5	8	9	1	4	1	3	1		1									
Maudhan	C			2																
Madagascar (see also table below): Tamatave	C												1						2	
Nigeria: Lagos	C		5																	
	D		5																	
Plague-infected rats			6																	
Peru (see table below).																				
Senegal (see table below).																				

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C, indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11	July 18	July 25	August, 1931: 1	Aug. 8	Aug. 15	Aug. 22	Aug. 29	September, 1931: 5	Sept. 12	Sept. 19
Siam	C	31	1	2	1															
	D	7	1	2	1															
Bangkok	C	29																		
	D	6																		
Nagara Rajsima	C	1																		
Spain: Hospitalet—Barcelona Province	C															5	1			
	D															2				
Syria: Beirut	C									1		1			1				1	
Tunisia: Tunis	C	10	16	16		82		1												
	D	4	8	3		1														
Union of South Africa:																				
Cape Province	C		3																	
Orange Free State	C	6	2	2																
	D	1	2	2																

Place		Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931	Aug., 1931
British East Africa (see also table above):							
Kenya	C	7	345	245	154	484	
Indo-China (see also table above)	C	4	11		2	1	
	D		2		2	1	
Madagascar (see also table above):							
Ambositra Province	C	70	30	19	15		
	D	86	29	18	15		
Antsirabe Province	C	83	48	7	8		
	D	74	47	7	8		
Miarinarivo Province	C	19	6	2			
	D	19	6	2			
Moramanga Province	C	1		2			
	D	1		2			
Tananarive Province	C	90	41	18	2		
	D	81	40	18	1		
Peru	C	8	8	2	5	2	
	D	2	1		1		
Senegal:							
Baol [1]	C			4		27	101
	D			3		13	58
Dakar [1]	C		2	63	64	95	194
	D		1	49	56	73	106
Louga [1]	C	14	1	5	4	3	2
	D	6		2	2	1	1
Rufisque [1]	C			1	2	34	2
Thies [1]	C				12	16	26
	D				3	7	16
Tivaouane [1]	C		4	19	3	3	
	D			11	2	2	

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	Sept. 5, 1931
Algeria:																			
Algiers	C	1	2	2	1		7	1				1							
Constantine	C		1		1					1									
Arabia: Aden	C	1																	
Belgian Congo	C				47	27	15												
Belgium	C	1																	
Bolivia[1]																			
Brazil: Porto Alegre (alastrim)	C	7	49	53	19	2	3			9	10	9	13	11					
	D	1	1			1					1			1					
British East Africa: Tanganyika	C	91	8		13			1	6	37	83		29	1					
	D	13	3							7	5		5						
British South Africa:																			
Northern Rhodesia	C										21								
Southern Rhodesia	C						1				2								
Canada:																			
Alberta	C	1									1				1				
British Columbia	C	8										2	2			3		1	
Manitoba	C	1			4														
Winnipeg	C	1																	1
Nova Scotia	C		1																
Ontario	C	29	9	17	25		4	3	14	3	6	12	1		2	2	4		
Kingston	C	1		5															
North Bay	C	1																	
Ottawa	C	1						1											
Sault Ste. Marie	C	2		4	1														
Toronto	C		2	4	1			1											
Quebec	C									1									
Saskatchewan	C	63	58	46	48	7	16	18	13		13	10	19		10	6	10		8
Regina	C	1	2	2	2														
Canary Islands: Las Palmas	C		1																
Chile:																			
Antofagasta	C									1									
Chanaral	C				1														

[1] An epidemic of smallpox was reported on May 18 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	Sept. 5, 1931
China:																			
Amoy	C		1	2	6	1	2		1	1	1			1					
	D		1	1	3	1	1		1	1	1			1					
Canton	C	3	7	4	3			1		1			1						
Foochow	C	P	P	P	P		P						P		P				
Hankow	C	8	3	3	5	1	1	1	1	1									
Hong Kong	C	9	2	3	1														
	D	3	2	1	2														
Manchuria—																			
Harbin (see also table below)	C	4	2		3														
Kwantung—Dairen	C		2	2	2	1													
Nanking	C	P	P	P	P														
Shanghai—																			
Foreigners only	C	16	6	17	7	2	6	2	1	2	1								
Including natives	D	14	10	18	7	1	5	4	3	2	1	2	1				1	1	
Swatow	D	13	26	2															
Tientsin	C				2						2	1							
Chosen (see table below).																			
Colombia: Cali	D				1														
Dutch East Indies:																			
Batavia and West Java	C	2	1		2														
	D	1																	
East Java and Madura	C				1														
Finland	C			1															
France (see table below).																			
Great Britain:																			
England and Wales	C	745	795	744	570	83	94	62	48	56	45	50	36	26	25	19	21	33	
Bradford	C	1	2	6	8			5											
Leeds	C		1	2	2														
London	C	98	147	227	183	25	50	31	16	21	9	12	12	6	12	4	4	3	
London and Great Towns	C	683	544	558	403	57	84	49	38	53	33	34	32	22	20	17	10	13	
	D	1		2		1				1									
Sheffield	C	32	10	7															
Stoke-on-Trent	C	1																	
Greece (see table below).																			

Honduras:																			
Amapala	C	1																	
Ocotepeque and Gracias districts	C	P																	
Puerto Castilla	C	3																	
Tegucigalpa	C			1															
Tela	C			1															
India	C	12,222	11,791	14,265	11,403	2,170	1,856	1,622	1,665	1,492	1,376	1,236	1,255						
	D	2,660	2,261	2,923	1,840	465	474	376	389	404	363	292	293						
Bassein	C				1														
Bombay	C	6	10	8	9		2	1	3		1	3	2	1		1			
	D	3	4	5	4		1	1	3		1	3	2	1					
Calcutta	C	251	382	287	89	14	19	14		11	6	2	2	4	4		5	2	
	D	188	203	224	75	12	18	11		9	4	3	2		4		5	2	
Cochin	C	59	46	39	3										1	1			
	D	3																	
Karachi	C	4	4	6				2						1					
	D		2					1											
Madras	C	8	22	19	8			1	1		2			1					
	D	1	3	5	6				1										
Negapatam	C			3				2	1			1			2			3	
Rangoon	C	4	3	11	13		1	4	1	2		1		2		1	1	1	
	D		1	1	5		1		1	1				1			1		
Vizagapatam	C	8	2	10	6	2	1		3	2		2	1		3		2	3	
	D	2	1	2	1		1		1	1					3		1	3	
India (French):																			
Chandernagor	C	12	14	10	7			1		2		1							
	D	1	2	7	5					2									
Karikal	C	19	3	4	4	1	2		3	1	1	1	1	1		1			
	D	18		3	4	1	2		3	1	1	1	1	1		1			
Pondicherry Province	C	19	14	6	11	3	2	1	1	4	1		23	11			3	1	
	D	19	14	9	11	3	2	1	1	4	1		23	11			3	1	
India (Portuguese)	C	14	8	21	3														
	D	3	3	6	1														
Indo-China (see also table below):																			
Pnompenh	C		1		1	2													
	D				1														
Saigon and Cholon	C	4	8	1	2					1			2	1	1			1	
	D	1	8	1	1					1				1				1	
Iraq:																			
Baghdad	C	9		2	3		1												
	D				2														
Basra	C				2		1												
Mosul Liwa	C	5										1					1		
	D	1																	
Ivory Coast (see table below).																			
Japan:																			
Kobe	C	2																	
Nagoya	C											1							
Mexico (see also table below):																			
Jalisco (State)—Guadalajara	D		1	1	2		1			1	1		1			2			
Mexico City and surrounding territory	C	23	33	43	45	5	4	16		12	5	4	1	8	2				
	D	8	22	14	11	4	3	6		4	3	1		1	1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931 6	13	20	27	July, 1931 4	11	18	25	August, 1931 1	8	15	22	29	Sept. 5, 1931
Mexico—Continued																			
Monterrey	C					1													
Torreon	C			1	1			1	2										
	D			2				1	1										
Vera Cruz	C	3	2	2	1														
Morocco (see table below).																			
Nigeria: Lagos	C		2																
Poland	C	1			3	1	1		1		17		1						
Portugal: Lisbon	C	40	52	56	67	5	17	12	14	15	12	18		17	12	8		10	
Rumania (see table below).																			
Siam	C	2		1	6			4	1		1	1							
	D				1				1			7							
Spain	C	P	P																
Straits Settlements	C	2	4	10	2										1				
	D	1	1	5	2														
Sudan (Anglo-Egyptian)	C	97	8	3	6		1												32
	D	10	2		2														6
Sudan (French) (see table below).																			
Syria (see table below).																			
Tunisia: Tunis	C		4																
Turkey (see table below).																			
Union of Socialist Soviet Republics (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P														
Orange Free State	C	P	P	P	P	P	P	P	P	P	P	P							
Transvaal	C	P	P					P		P	P	P							
Upper Volta	C	18	3	3	88	11		1		1		1							
	D		1		1														
On vessel:																			
S. S. Clan Mactoggart at Suez	C	2																	
S. S. Clan Buchanan at Suez	C	2																	
S. S. Rotterdam at Naples from Venice	C		1																
S. S. Clan McTavish at Manila from Chittagong	C			1															

S. S. Clan MacBrayne at Cochin	C	1																	
S. S. Chilka at Rangoon	C	1																	
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C			1												1			
S. S. Talodi at Suakin	C				1														

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
China: Harbin (see also table above)	C			7		13	10	
Chosen	C	1		11		1	4	
	D	1		3				
France	C	4	16	15	6	54		
Greece	C		4			3	1	
Mexico (see also table above)	D		3		1	1	2	
Morocco	C		4	6	7	49	48	23

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Rumania	C			1		1		
Turkey	C	63	37	1		9	1	
	D	7	6					
Union of Socialist Soviet Republics:								
Territories in Asia	C	194	532					
Ukraine	C	44	23					
Other territories in Europe	C	896	1,577					
Railroads, etc	C	43	77					

Place		January, 1931	February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			August, 1931		
						1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11. 20	21. 31
Indo-China (see also table above)	C	141	168	264	142		17	41	30	16	1	1		7	29		
Ivory Coast	C																7
Sudan (French)	C			4													
Syria: Beirut	C	1								1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 8–Mar. 7, 1931	Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3 30, 1931	Week ended— June, 1931				July, 1931				August, 1931				
						6	13	20	27	4	11	18	25	1	8	15	22	29
Algeria:																		
Algiers	C	2	3	3	7	4	4		1			2						
Bone	C															1	1	
Constantine Department	C	4	3	9	22	6	3	1	16	2		1		3				
Oran	C	1		1	2	2									1			
Australia, Western	C		1	1	1													
Bulgaria	C	5	9	30	16	11	10	6	3									
	D		2	3	4	2	1	1	2									
Chile: Valparaiso	D	1																
China:																		
Canton	C		1															
Manchuria—Harbin	C	5	3	8					16									
Shanghai	C											1						
Tientsin	C			2														
Chosen (see table below).																		
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C			1		1	1		1									
Beheira Province	C			4														
	D			2														
Cairo	C																	1
Eritrea: Asmara	C		1															
Great Britain: Scotland—																		
Fife County	C				1													
Greece (see table below).																		
Guatemala [1] (see table below).																		
Iraq: Baghdad	C	5	2		2													
	D	1			2													
Irish Free State:																		
Cork County—																		
Schull	C										1							
Skibbereen	C						1		1	1								
Kerry County—																		
Dingle	C				1													
Listowel	C								1									

Limerick County—																		
Limerick	C									2				1				
Michelstown	C									1								
Mayo County—																		
Belmullet	C				1													
Westport	C																1	
Japan	C								1									
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D												1					
Mexico City, including municipalities in Federal District	C	35	216	170	75	7	12	27		28	9	7	9	7	6		5	
	D	16	84	56	33	4	4	11		4	3	2	3	5	3		2	
San Luis Potosi	C	5	5	3	2						1	3					1	
Torreon	C												1					
	D												1					
Morocco	C	28	7	13	42		31	42	28	37	20	24	21		2	1	5	
	D	1		1	4		2	3	1	4	4							
Palestine	C	3	5	5	4		2	3		2				3	3	1	4	
Panama Canal Zone—Balboa	C				2													
Paraguay: Asuncion	D	1	1															
Poland	C	189	287	538	298		48	33	16	9	17	13	14	10	4	10	7	6
	D	19	15	28	18		2	1	1	2	1	1	1	1		1		
Rumania	C	152	214	70	169	42	16	12	10	2	2	7						
	D	24	16	8	18	4	7	2		2	2	1						
Syria	C				4													
Tunisia:																		
Sbeitla, vicinity of	C		20	12														
	D		7															
Sfax	C		2															
Tunis	C	18	14	13	23		64	9		1			1					
	D				3		4											
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below).																		
Union of South Africa:																		
Cape Province	C	P	1	P	P	P	P	P		P	P	P	P					
Municipality of East London	C		P					1						1				
Natal	C	P	1	P	P	P	P	P	P			P	P					
Orange Free State	C	P	P	P	P	P	P	P		P	P	12	P					
Transvaal	C	P	P	P	P	P	P	P		P	P	P	P					
Yugoslavia (see table below).																		

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reported an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Chosen: Seoul	C	124	3	4		6	
	D	8		1		1	
Czechoslovakia	C	26		5	11	2	
Greece	C	17	8	22	6	9	1
	D	2	1	3			
Guatemala	C					33	34
	D					15	5
Latvia	C	12					
Lithuania	C	3	99	34	10	13	
	D	1	3	5		2	
Mexico (see also table above)	D	83					
Turkey	C	18	15		3	3	2
Union of Socialist Soviet Republics:							
Territories in Asia	C	260					
Ukraine	C	419					
Other territories in Europe	C	1,373					
Railroads, etc	C	158					
Yugoslavia	C	12	10	43	14	2	3
	D		1	5			

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	June 13	June 20	June 27	July, 1931: 4	July 11	July 18	July 25	August, 1931: 1	Aug. 8	Aug. 15	Aug. 22
Brazil:																
Alagoas State	C														1	
	D														1	
Bahia State	C	1														
Ceara State	C	2	2	1	1											1
	D		2	1												1
Minas Geraes State	C	2	5	2												
	D	1	2	1												
Rio de Janeiro State	C	2		2												
	D	2														
Cambucy	C	1														
Sergipe State	C					1										

British Cameroons: Mamfe	C			3	1		1									
	D			2												
Colombia—Magdalena Province—Near Cienaga	C										4					
Gold Coast:																
Akuse	C								2							
	D								1							
Dagomba District	C												2			
Kintampo	C										1					
	D										1					
Tamale	C									2						
	D									2						
Wale Wale	C												1			
	D												1			
Ivory Coast:																
Bobo Dioulasso	C									1						
	D									1						
Grand Bassam	C												4			
Kong Circle	C										4					
Seguela	C															P
Nigeria: Abakaliki	C													1		
	D													1		
Senegal: Podor (Hinterland)	C															1
	D															1
Sudan (French)	C										4	P				
Upper Volta:																
Banfora	C											2				
	D											1				
Ouagadougou	C															

X

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 46 OCTOBER 2, 1931 NO. 40

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

August 16–September 12, 1931

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized in this report. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Poliomyelitis.—A total of 8,922 cases of poliomyelitis has been reported since January 1, 1931, as compared to 1,403 during the same period of 1929 and 3,473 for 1930. Nearly 5,000 of the 8,922 cases since the first part of the year were reported during the present 4-week period ended September 12. More than 1,000 cases has been reported during each of the past six weeks.

The peak of the epidemic, however, seems to have been passed. For the week ended September 12, 1,160 cases were reported, as compared with 1,370 during the preceding week, which represented the maximum weekly number of cases reported up to that date. Table 1 shows for six geographic areas the number of reported cases during each week since the first of June, with comparative data for the corresponding weeks of the two preceding years.

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The number of States included for the various diseases are as follows: Typhoid fever, 47; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 45; diphtheria, 47; scarlet fever, 47; influenza, 39 States and New York City. The District of Columbia is counted as a State in these reports.

TABLE 1.—*Number of poliomyelitis cases reported in different geographic areas in 1931, with comparative data in 1930 and 1929*

Geographic division and year	Total, Jan. 1–Sept. 12	Week ended—															
		September			August				July				June				
		12	5	29	22	15	8	1	25	18	11	4	27	20	13	6
All regions:																	
1931	8,922	1,160	1,370	1,321	1,135	1,040	1,029	598	307	116	90	45	40	37	38	26
1930	3,473	420	344	325	303	256	224	221	196	213	173	120	105	70	52	41
1929	1,403	145	124	103	114	109	65	64	76	51	34	25	22	30	29	18
N. E. and Mid. Atl.:																	
1931	6,672	798	1,031	1,028	916	890	919	525	253	82	56	16	15	10	8	7
1930	643	84	69	118	90	61	32	30	22	17	5	8	7	6	3	2
1929	447	55	47	45	51	40	19	19	20	14	5	7	7	9	7	4
E. N. Central.																	
1931	1,211	203	228	196	135	95	48	40	28	17	5	13	6	4	6	1
1930	411	96	61	32	44	28	21	9	13	10	20	9	0	6	3	1
1929	223	37	17	13	15	13	11	6	3	2	5	2	2	2	5	4
W. N. Central:																	
1931	409	63	69	53	45	31	24	13	7	3	4	3	2	3	6	3
1930	553	128	108	67	55	52	25	26	19	18	11	2	2	4	0	2
1929	77	4	5	2	5	2	3	4	4	1	2	1	3	5	3	2
S. Atlantic:																	
1931	204	[illegible]	15	26	18	15	12	8	6	3	10	3	7	6	4	3
1930	179	[illegible]	8	6	6	11	10	7	9	8	8	7	7	3	7	7
1929	339	31	38	19	19	37	20	25	30	19	12	6	2	5	8	2
S. Central:																	
1931	168	12	10	6	9	3	9	6	6	7	8	4	5	7	5	1
1930	564	24	40	33	45	47	61	54	29	50	37	16	34	15	5	11
1929	150	12	6	13	15	11	7	4	13	6	5	6	3	4	1	1
Mount. and Pac.:																	
1931	258	12	17	12	12	6	17	6	7	4	7	6	5	7	9	11
1930	1,123	69	58	69	62	57	75	95	104	110	92	78	54	36	34	18
1929	167	6	11	11	9	6	5	6	6	9	5	3	5	5	5	5

In the New England and Middle Atlantic States, where the great majority of the cases have occurred, the number of cases reported reached a maximum in the week ended September 5, the number for the week ended September 12 being considerably below each of the five preceding weeks. The West North Central States likewise showed a slight drop in the week ended September 12 from the preceding week, indicating that here also the peak may have been passed. In the East North Central States, however, the maximum week thus far is the last week for which data are available. So few cases have been reported so far in the Southern, the Mountain, and the Pacific States that it can not be definitely said whether or not the peak has been reached.

Table 2 shows by weeks the number of cases of poliomyelitis reported in each State and in New York City. In New York City the maximum number of cases was reported during the first week of August, but in the remainder of New York State and in Massachusetts and Connecticut the peak came about a month later, during the first week in September. In several of the New England and Middle Atlantic States the last week for which reports are available has the maximum number of cases. In the majority of the East North Central States also the number of cases reported for the last available

week was higher than during any preceding week. In Minnesota, the only State in the other regions with any considerable number of reported cases, 48 cases were reported during the week ended September 12 and 50 during the preceding week.

TABLE 2.—*Number of poliomyelitis cases reported in recent weeks in each State*

State	Week ended—														
	Sept. 12	Sept. 5	Aug. 29	Aug. 22	Aug. 15	Aug. 8	Aug. 1	July 25	July 18	July 11	July 4	June 27	June 20	June 13	June 6
N. E. and Mid. Alt.:															
Maine	2	5	6	7	2	7	4	1	0	0	2	0	0	0	0
New Hampshire	6	2	4	7	3	0	1	0	1	0	0	0	0	0	0
Vermont	12	6	5	7	5	0	0	0	1	0	1	0	0	0	0
Massachusetts	127	184	135	115	90	67	25	16	16	6	5	5	2	2	3
Rhode Island	21	14	20	22	18	16	8	0	0	1	0	0	0	0	0
Connecticut	92	162	134	115	67	97	37	11	5	7	2	2	0	0	1
New York City	254	347	432	422	512	591	404	105	53	31	5	6	4	4	1
New York State, except New York City	176	207	180	133	88	85	29	9	4	5	0	1	2	1	0
New Jersey	94	84	103	78	97	55	16	14	1	3	0	1	0	0	1
Pennsylvania	14	20	9	10	8	1	1	7	1	3	1	0	2	1	1
East North Central:															
Ohio	23	6	18	2	9	5	1	1	1	0	5	2	0	1	0
Indiana	4	4	3	3	3	1	0	0	0	0	0	1	1	0	0
Illinois	39	42	38	36	26	15	15	12	3	2	4	2	0	1	0
Michigan	114	107	76	68	33	17	13	9	7	0	2	1	3	3	1
Wisconsin	83	69	61	26	24	10	11	6	6	3	2	0	0	1	0
West North Central:															
Minnesota	48	50	39	31	29	13	10	3	1	1	0	1	1	2	0
Iowa	5	6	8	8	1	3	1	1	0	0	0	0	0	0	1
Missouri	2	3	4	3	0	7	2	0	0	0	1	0	1	1	1
North Dakota	5	2	0	2	0	1	0	0	0	0	0	1	1	2	0
South Dakota	1	2	0	0	1	0	0	0	1	2	0	0	0	1	0
Nebraska	1	5	1	0	0	0	0	0	0	1	0	0	0	0	0
Kansas	1	1	1	1	0	0	0	3	1	0	2	0	0	0	1
South Atlantic:															
Delaware	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Maryland	1	5	1	2	1	1	0	1	0	0	0	0	0	0	0
District of Columbia	0	0	0	2	1	1	1	0	0	0	0	0	0	0	0
Virginia	2	1	2	0	0	0	0	0	0	0	0	0	0	0	0
West Virginia	5	3	10	5	2	1	1	1	0	0	0	2	0	0	1
North Carolina	3	5	4	8	10	5	1	2	1	4	2	2	1	0	0
South Carolina	0	1	2	1	0	0	3	2	2	4	0	1	5	3	1
Georgia	1	0	7	0	1	3	1	0	0	1	1	1	0	1	1
Florida	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0
E. and W. S. Cen.:															
Kentucky	1	1	1	4	0	2	0	0	0	0	0	1	0	0	0
Tennessee	5	0	1	1	0	2	1	1	1	0	0	0	0	1	0
Alabama	4	4	0	4	0	0	0	1	1	4	0	1	1	1	1
Mississippi	1	1	2	0	1	0	1	0	2	4	0	0	3	0	0
Arkansas	0	1	1	0	0	0	0	0	0	0	1	0	0	1	0
Louisiana	0	2	0	0	0	0	1	1	0	0	1	2	0	1	0
Oklahoma	0	0	0	0	1	1	1	2	1	0	0	1	2	1	0
Texas	1	1	1	0	1	4	2	1	2	0	2	0	1	0	0
Mount. and Pac.:															
Montana	3	2	3	3	1	2	1	1	0	0	0	1	1	1	0
Idaho	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Wyoming	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0
Colorado	0	0	0	1	0	0	1	0	0	0	0	0	0	2	0
New Mexico	1	0	1	1	0	1	1	0	0	0	0	0	0	0	0
Arizona	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Utah	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Washington	1	4	0	3	3	4	0	2	1	1	0	0	0	1	0
Oregon	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0
California	7	8	6	3	2	9	3	4	3	6	5	4	6	5	9

Scarlet fever.—All geographic areas showed an increase in reported cases of scarlet fever during the 4-week period ended September 12. The increase amounted to 15 per cent over the preceding 4-week period. The number of cases (3,887) was also about 36 per cent in excess of the number recorded for the corresponding period in 1930 and 12 per cent above the figure for 1929. The increases in the various areas ranged from 6 per cent in the South Atlantic States to 61 per cent in the South Central groups

Diphtheria —For the first time during the current year the number of cases of diphtheria reported for any 4-week period exceeded the number reported for the corresponding period in 1930. For the 4-week period ended September 12, the number of cases totaled 3,130, which represented a 23 per cent increase over last year's figure. The South Central States seemed to be mostly responsible for this situation. More than three and one-half times the number of cases of diphtheria was reported from those States for the current period than occurred during the preceding period, and the number reported (1,056) was more than three times the number reported for the same period in 1930. Practically all other regions continued to show decreases from last year. For this period in 1929 the number of cases totaled 3,727—approximately 600 more than occurred this year and 1,200 more than were reported for the same period in 1930.

Smallpox.—The incidence of smallpox continued to be the lowest in recent years. Reported cases numbered 405, as compared with 660 cases during the same period last year and 753 cases in 1929. This favorable situation applies to all regions except the New England and Middle Atlantic groups, where there were 18 cases reported for the current period as against 2 for the same time in 1930. Fourteen of the 18 cases occurred in Vermont. In the other groups the decreases ranged from 4 per cent in the Far West groups to 54 per cent in the South Atlantic States.

Meningococcus meningitis.—The incidence of meningococcus meningitis continued at a lower level than in the two preceding years. The number of cases reported was 259, as compared with 354 for the corresponding period in 1930 and 385 in 1929. All regions shared in this decline except the South Atlantic, where an increase of 47 per cent over last year's figure occurred. The number of cases (22), however, was not large and they were widely distributed over the whole area.

Measles.—For measles, also, the comparison with recent years was favorable. The number of cases reported (1,908) for the current 4-week period was approximately 87 per cent of the number reported for the same period in each of the two preceding years. The South Atlantic States alone reported an increase (35 per cent) in the number of cases over last year. Other groups either approximated last year's figures or showed decreases ranging from 21 to 36 per cent.

Influenza.—For the current 4-week period there were 1,011 cases of influenza reported, as compared with 875 for the corresponding period in 1930 and 1,128 cases in 1929.

Typhoid fever.—Reports indicate that typhoid fever was slightly less prevalent than at the same time last year. In most regions the incidence very closely approximated that of last year, but in the West North Central a decrease of about 30 per cent was recorded. For all reporting States the cases totaled 3,914, as compared with 4,030 last year. In 1929 the number of cases reported for this period was 3,418.

Mortality, all causes.—The mortality from all causes in large cities, as reported by the Bureau of the Census for the current 4-week period was the same as last year, viz, 9.9 per thousand population (annual basis). For the same period in 1929 and 1928 the rate was 10.6.

PRESENT DAY PROBLEMS OF YELLOW FEVER[1]

By Hugh S. Cumming, *Surgeon General, United States Public Health Service, Director, Pan American Sanitary Bureau*

Except in reminiscence, the average physician rarely gives a thought to yellow fever. No doubt some believe that the disease has been almost eradicated and that it will soon disappear from the entire world; but it is by no means near extinction. There is a vast reservoir of yellow fever in west Africa; the disease still persists in certain parts of Brazil; and in 1929 it reappeared in Colombia. It is not only possible but extremely probable that, on account of increased and more rapid means of intercommunication, particularly increase in travel by airplane, yellow fever will reappear in many former endemic centers and even spread to countries never before infected, unless the strictest vigilance is maintained to prevent it.

The virus of yellow fever remains undiscovered. This unknown but living entity, when first it gains access to the blood of human beings, produces yellow fever in most adults, often resulting in death. In children, and also in many adults, the virus of yellow fever may be present and complete its life cycle in the body without producing recognizable manifestations of its presence. This fact gives rise to large numbers of "missed" or unrecognized cases of the disease.

Until recently it was believed that a single mosquito (*Aëdes aegypti*) was alone responsible for the transmission of yellow fever and that in the absence of this species, which does not breed in ground water, the disease could not be propagated. Then, too, it was frequently believed that this insect would not fly more than about 200 meters. We are now told that there are 13 species of mosquitoes

[1] Read before the Third Pan American Medical Congress, Mexico City, D. F., July 27, 1931.

that can convey yellow fever, and that *Aëdes aegypti* will travel from 400 to 1,000 meters; that, under laboratory conditions, the virus of yellow fever may be passed from one mosquito to another; and that some of the newly discovered vectors breed in ground water.

Certain species of monkeys develop yellow fever when bitten by infected mosquitoes, and laboratory cases have occurred in human beings in which infection by mosquitoes could, apparently, be entirely excluded, suggesting infection by contact.

A very successful biological test has recently been devised whereby we can be sure that a given individual has or has not, at some time, suffered from yellow fever, and this test holds good in positive cases after a lapse of many years since the attack.

Efforts are still being made to immunize against yellow fever with, as yet, varying and unsatisfactory results.

It is hardly possible at this time to evaluate our newer knowledge of yellow fever or to express it in terms of prophylaxis and control. However, it is not believed that yellow fever is ordinarily contagious; and it is doubtful whether the transmission of the disease from mosquito to mosquito is an important factor in rapidly propagating the disease, though it may be in maintaining its existence. It is still a question whether vectors which breed in ground water are a serious epidemiological factor on this continent; but we can not ignore them. I venture to say that the susceptible human (or animal) host is a necessary link in the continued existence of yellow fever in spite of the apparent demonstration of the infection of one mosquito by another.

To sum up the effect which this newer knowledge of yellow fever may have in combating the disease, it may be said that, while these new discoveries enable us to combat yellow fever more effectively, they reveal to us the fact that our goal of complete extermination is, apparently, a far more formidable task than we were led to believe a few years ago.

The prevention of the spread of yellow fever and its eradication can no longer be regarded as the individual affair of the nation in whose territory the disease exists; it is a matter of interest to the entire world. The presence of yellow fever in one country is the immediate concern of all countries within striking distance of the disease and, for humanitarian reasons, the collective concern of all civilized nations. There must be no retrogression nor relaxation of effort in the struggle to control, and eventually to exterminate, this dangerous disease. On the contrary, there should be a forward, a continuous, a persistent attack on every lurking focus until yellow fever is annihilated, even though it should require decades, yes, centuries, of effort to accomplish this result.

Inasmuch as an attack of yellow fever confers lasting immunity, it seems possible that we may some day be able to immunize against this disease, and it is to be hoped that research workers will continue their efforts in this field as well as in other directions.

The most important problem of yellow fever with which we, as sanitarians, have to deal at the present time is two-fold in character; namely, first, to keep yellow fever out of territory that is not now infected and, second, to exterminate the disease wherever it exists. In order to secure the means of accomplishing these results, the world must not be allowed to forget the havoc that yellow fever has caused in times past, nor must it be allowed to forget the fact that this disease still remains for us a very potential danger, capable of destroying life and of paralyzing commerce, if not kept within bounds.

In order successfully to combat yellow fever, we must first know where it is. It is, therefore, the solemn duty of all nations to investigate faithfully every outbreak of disease, however small, that in any way resembles yellow fever. It is a nation's duty, too, when the disease is found, immediately to report the fact to other nations, an obligation which has frequently been assumed by international treaty, an obligation as binding now as in former years, and one which involves the integrity of the nation.

In connection with the reporting of yellow fever it may be said that not infrequently it has happened that the presence of this disease has been overlooked. It may be accepted as an axiom, I think, that if only occasionally a case of yellow fever is reported, it must be true that there are many cases that are not recognized. Perhaps the most of these are in children, but we know now that the disease may be overlooked in adults as well. A resort to the biological test by means of blood surveys, as devised recently by workers of the Rockefeller Foundation and others, should be made whenever circumstances seem to indicate the existence of hidden foci.

When a nation is honestly reporting its cases of yellow fever and striving to control the disease, the health authorities of other nations must not allow themselves to be stampeded into enforcing unreasonable quarantine measures; they should discourage undue and exaggerated publicity in the daily press and, while taking reasonable precautions to protect their own people, they should limit such precautions to such measures as may be necessary to keep out the disease; commercial relations should be interfered with as little as may be consistent with safety.

So long, however, as yellow fever remains in the territory of any country, other nations with infectible territory must necessarily exercise the right to quarantine against those places where the disease exists. Quarantine measures which afford full protection to-day may be found to be wholly inadequate to-morrow, depending on the appear-

ance of new foci and the development of new and more rapid facilities for intercommunication. The necessity for quarantine measures against yellow fever increases with proximity to the focus of infection, with the extent of the infection, and with rapidity of travel. Ports and places in many parts of the world that were formerly weeks apart by ordinary means of communication are now within a few days of each other by airplane.

Time does not permit me to go into detail in discussing quarantine measures against yellow fever. These will depend in general on whether persons may pass from infected areas immediately, on foot, by animal transportation, by automobile, by rail, by ship, or by aircraft.

In order to prevent the introduction of yellow fever from one country into another, infected persons must be prevented from passing into infectible territory, whether they be in the incubation stage of the disease or in the period of concealed or unrecognizable attack, or they must be held in quarantine until their blood is no longer infective for vectors; also, common carriers, such as vessels and aircraft, must be free from infected vectors on departure, or they must be freed from such immediately on arrival.

In actual practice, the foregoing requirements assume the detention of exposed persons under perfect protection at the port of departure (a difficult procedure and one that is useless when not properly performed) or the completion of the infective period under mosquito-free conditions en route, or its completion at the place of destination.

Vessels must lie at safe anchorages or must be freed from vectors at the port of departure, or this must be done at the port of arrival. If there may have been infected vectors on board en route, the personnel must be detained.

Aircraft must remain in vector-free aerodromes at the place of departure or they must be similarly freed from vectors at the place of arrival and the personnel held.

These measures are the substance of protection and seem to constitute substantially the framework of quarantine procedures. It will be left to your imagination to work out the details and complete the structure. I may add that quarantine measures should not be so rigid as to paralyze international commerce, and we should bear in mind that our object is a maximum of protection with a minimum of restrictive measures. The work of extinguishing yellow fever from endemic centers is our greatest task, and it is, at the same time, our final goal.

In spite of the possibility of the direct passage of the virus of yellow fever from mosquito to mosquito, I think we may still assume, as a

working basis, that, in order for endemicity in yellow fever to exist, the following factors must be constantly present, namely—

(1) The causative agent of the disease—that is, the virus of yellow fever;

(2) Functionally active vectors (*Aëdes aegypti* mosquitoes); and

(3) Human beings (or closely allied animal species) susceptible to the disease.

This being true, in order to eradicate yellow fever from endemic foci it is necessary to eradicate yellow-fever-bearing mosquitoes, or at least to reduce their number to a degree incompatible with the spread of the disease. An *Aëdes aegypti* index of 5 per cent is usually taken as the upper limit of safety in pronounced endemic centers—that is, in areas where there are very few nonimmunes other than new-born or very young children.[2] In more populous epidemic centers or places where there are relatively long intervals between outbreaks, and consequently a much larger number of persons who have never had yellow fever, the consensus of opinion of experienced sanitarians is that an index of 1 per cent may be regarded as the maximum of safety if the disease is to be controlled promptly. In fact, in such areas, the nearer the index approaches zero, the more satisfactory the results will be. Experience has shown that it is not usually practicable to control the human carrier or victim of the disease even for the few days during which he is infectious. Experience has also shown that it is not feasible to exterminate any species of insect by attacking only the adult members. For these reasons it seems logical to resort to two principal and three auxiliary measures for the eradication of yellow fever. These are as follows:

Principal measures.—(1) Careful clinical and biological (laboratory) surveys to determine the existence of yellow fever infection; (2) effective work in the prevention of the breeding of yellow-fever-bearing mosquitoes, particularly *Aëdes aegypti.*

Auxiliary measures.—(1) The screening of dwellings in general and especially prompt and early screening of the house occupied by actual or suspected victims of the disease; (2) the destruction of presumably infective adult mosquitoes; (3) the screening of all buildings in which human beings sleep.

No attempt will be made here to describe the method of making blood examinations in surveying communities to determine the presence of yellow fever. It is sufficient to say that the blood of persons who have had yellow fever, even when years have elapsed since the attack, will protect susceptible monkeys against inoculation with the virus of the disease. There is also a difference in the reaction of white mice inoculated with yellow-fever virus and given serum from a per-

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[2] In quasi-epidemic rural areas having a sparse population, an index of 2 per cent may be regarded as the maximum for the satisfactory control of the spread of the disease.

son or animal that has had the disease, and other white mice which have been inoculated with the virus but which have not received the protective inoculation of immune serum.

An adequate continuously running water supply is of the greatest value in enabling departments of health to abolish the artificial containers in which *Aëdes aegypti* breed. In the absence of such a supply, resort must be had to thorough, continuous, and effective screening of such containers as are indispensable and the abolition of those that are not.

There are some workers who would dispense with two of the auxiliary measures mentioned; namely, the screening of yellow-fever patients and the destruction of adult infected mosquitoes. They object to attempting to screen patients on account of the difficulty of discovering all cases, particularly when in the infective stage. Objection is also made to the inconvenience of attempting to destroy infected adult mosquitoes in homes.

While universal screening is by no means indispensable to success in combating yellow fever, there can be no doubt, I think, of the desirability of general screening on as large a scale as possible, whenever this can be effectively done. Persons have been known to live in yellow-fever endemic areas for years without contracting the disease when occupying sleeping quarters adequately screened against mosquitoes.

In conclusion, may I again appeal to the entire medical profession, to the layman, and particularly to the business man, whose commercial interest are threatened, not to allow interest in the subject of permanent eradication of yellow fever to be lost. Universal cooperation is vital to success in this great undertaking.

THE USE OF THE WHITE MOUSE IN RESEARCH ON YELLOW FEVER

EXPERIMENTS CARRIED ON AT THE LABORATORY OF TROPICAL HYGIENE OF THE COLONIAL INSTITUTE OF AMSTERDAM [1]

The results of the researches of Dinger, complementing those of Max Theiler, on the action of the yellow fever virus on the white mouse, open in perspective the utilization of this rodent to delimit the regions where yellow fever persists under a clinically unrecognizable form.

Max Theiler sought, for the study of yellow fever, a more easily handled animal, and particularly one less expensive, than the *Macacus rhesus*. It is generally known that, among the usual laboratory ani-

[1] Communication presented to the Permanent Committee of the International Office of Public Hygiene in the session of May, 1931, by Dr. W. De Vogel, former Inspector-in-Chief of the Civil Medical Service in the Netherlands Indies, Delegate from the Netherlands Indies. Translation from the Bulletin Mensuel, Office International d'Hygiène publique, July, 1931, pp. 1210–1215.

mals, rabbits, guinea pigs, rats, and mice are refractory to yellow-fever infection introduced by the hypodermic or blood route, as well as to the bites of the *Aëdes aegypti* capable of transmitting yellow fever to man and to the *rhesus*. However, Max Theiler, guided by the observations of Lasnet and Laigret relative to the nervous troubles which manifest themselves at the onset of yellow fever, and also by the recommendation of Laigret to search for the yellow-fever virus in the nervous tissues, tried to inoculate the white mouse by the cerebral route, until then considered as insusceptible to yellow fever.

A drop, two at the most, of blood or of a brain emulsion of a *rhesus* infected with yellow fever during the virulent period, injected into a cerebral lobe of a white mouse, is sufficient to infect it.[2] The infection may be transmitted by the cerebral route from mouse to mouse. From November 8, 1928, to January, 1930, Theiler had already made 75 passages.

It is striking that, in the white mouse, the virus is found to be uniquely neurotrophic. The spinal cord of a mouse which has succumbed to the cerebral infection, as well as its sciatic nerve and its suprarenal gland, when made into an emulsion and introduced into the brain of a normal mouse, causes a specific encephalitis, while the blood and an emulsion of the other organs fail to produce this effect. (I recall that comparative anatomy teaches us that the origin of the medullary part of the suprarenal gland is associated with that of the ganglions of the sympathetic nerves.)

Theiler has also observed the neurotrophic character of the infection in young mice, aged from two weeks up, that develop a fatal infection from the intraperitoneal injection of the virus.

Indubitable proof that it is indeed the yellow fever virus that provokes these symptoms in the mouse may be furnished in two ways:

(1) By ascertaining that the virus of the mouse, inoculated in a healthy *rhesus*, itself produces yellow fever.

(2) By proving that the serum taken from a monkey or a man cured of yellow fever neutralizes the virus of the mouse.

It is on these two points that the investigations of Dinger have complemented those of Max Theiler.

(1) The latter succeeded in giving fatal yellow fever to a *rhesus* by injecting into the peritoneal cavity an emulsion of the whole brain of a mouse, the virus of which had had three passages from mouse to mouse. But he was not able to prove that he similarly transmitted yellow fever to two *rhesus* injected, respectively, with virus of the 29th and 42d passage. Consequently he did not consider the appearance of yellow fever in the first *rhesus* irrefutable proof of the culture

[2] The injection is made under aseptic precautions, using a fine needle of a Pravaz syringe, which is pushed through the skin and the skull beside the median line. Regular check is then made to eliminate encephalitis of bacterial origin; a particle of encephalitic brain, introduced into the usual nutritive media, must show no trace of growth.

of the virus in the mouse; as he made the passages by injecting the emulsion of the entire brain, including the inoculation site, there always remained the possibility after three passages that particles of virulent cellular tissue of the *rhesus*, from which the strain came, had directly induced the infection.

In a series of experiments reported in the accompanying table, Dinger showed that, independently of the number of passages the virus has been subjected to, virulence varied according to the time elapsed since the inoculation into the brain of the mouse. It attains the maximum from three to five days; but after the seventh day it seems to become incapable of provoking morbid symptoms.

Rhesus No.	Number of passages of the virus	Number of days since the mouse was inoculated	Reaction of the rhesus in which an emulsion of the brain of the mouse was injected
468	18	1	Dead after 8 days with all the signs of yellow fever.
466	12	3	Dead after 3 days with all signs of yellow fever.
465	4	4	Dead after 6 days with all signs of yellow fever.
461	8	5	Dead after 4 days with all signs of yellow fever.
464	3	5	Elevation of temperature from 3rd to 6th day, 40° C. Recovered.
453	4	6	Elevation of temperature on 6th day, 41° C. After cure, immunity.
462	2	7	Showed no morbid symptoms.

In all cases control mice succumbed after inoculation, exhibiting typical symptoms of encephalitis.

Dinger did not take advantage of the opportunity to study immunity in *rhesus* No. 464 and No. 462. About a month after recovering from the injection both animals died from intercurrent disease, without presenting any anatomical trace of yellow fever.

The transmission of yellow fever to the *rhesus* was also made by means of *Aëdes aegypti* that had fed on an emulsion of virulent mouse brains. These mosquitoes had been fed on sugared water since hatching. After they had fasted for 3 days, Dinger gave them for 3 days an emulsion of mouse brains containing virus of the 10th to 12th passage. Balls of cotton were saturated with this emulsion, in suspension in a solution of 0.1 per cent peptone and 10 per cent rabbit serum, and were placed within reach of the mosquitoes. After feeding from the balls of cotton, these *Aëdes aegypti* were again placed on sugared water. Twenty-six days later 9 mosquitoes had their first blood feeding on a healthy *rhesus*. The *rhesus* died 6 days later, presenting all the symptoms of yellow fever.

This experiment shows that the yellow fever virus multiplies in the *Aëdes aegypti*, even in the absence of blood. An emulsion of 4 of these mosquitoes ground up was injected into another healthy *rhesus*. The only reaction was an elevation of temperature to 40.3° C. A month later a trial inoculation showed that it had been rendered

immune to yellow fever. Some of its blood, taken during the febrile stage, 4 days after injection, was inoculated into the brain of two mice, which died with typical symptoms of encephalitis.

He thus proved in different ways that the virus grown in the brain of the mouse and the virus of yellow fever are truly identical.

(2) In order to investigate the action, on the virus infecting the mouse, of the serum of a *rhesus* or of a man recovered from an attack of yellow fever, Theiler prepared, in general, a suspension of the crushed brain of a mouse which had died with typical encephalitis, in 5 c. c. of saline physiological solution. In order to obtain a liquid free from particles of cellular tissue, he either let the suspension settle for an hour, or subjected it to slow centrifugation for 10 to 20 minutes. The upper clear layer was separated and then mixed with an equal volume of serum from a *rhesus* or man cured of yellow fever. After the anti-yellow-fever serum had remained in contact with the virus of the mouse from 20 minutes to 2 hours, 1 or 2 drops of the mixture were injected into the brain of a mouse.

Out of 39 mice so treated, 22 were inoculated without presenting any disorders and without acquiring immunity, while 17 died, having a typical encephalitis.

A mixture of the virus and the normal serum killed all 27 of the control mice; the neutralizing action of the anti-yellow-fever serum on the virus of the mouse is thus very evident. But one might still ask whether the absence of ascertained protection in 44 per cent cf the cases does not render doubtful the value of the mouse as a test animal for delimiting the regions where yellow fever persists in a clinically unrecognizable form.

Dinger, who, from the beginning, like Theiler, centrifugated the emulsion to free it from particles of cerebral tissue, could only confirm these unsatisfactory results.

Theiler explains these failures by observing that the upper layer of the emulsion subjected to centrifugation, although clear to the sight, still contains particles of cerebral tissue that shield the virus which they contain from the action of the immunizing serum. To eliminate these particles entirely, Dinger tried to pass the clear layer of the crushed brain emulsion, in suspension in a solution of 0.8 per cent sodium chloride, through a Seitz filter. But the filtrate was ineffective, all the mice which received an intracerebral injection remaining alive, while that portion which remained as residue, adhering to the outside of the filter, inoculated into two mice killed them after 7 and 9 days, with the typical symptoms of encephalitis.

This result was analogous to that which from the beginning caused the virus contained in the *Aëdes aegypti* to be considered nonfiltrable. Bauer and Mahaffy have shown the cause of this by proving that a pure 0.8 per cent solution of sodium chloride, which destroys the fil-

trable extracellular virus, has no effect on the virus contained in the cellular tissue of the mosquitoes. Likewise, the immunizing serum in the presence of a virulent brain emulsion only neutralizes the free virus, and is without action on the virus enclosed in the particles of cerebral tissue floating in the clear layer of the centrifuged emulsion. This virus, once introduced into the brain of the mice subjected to experiment, is still in condition to induce a fatal infection, thus causing the failures experienced.

Dinger was thus led to replace the sodium chloride solution in the emulsion by a 10 per cent solution of rabbit serum, without evidently at all lessening the virulence of the free virus. Thus prepared the emulsion gave a filtrate which, leaving sterile the usual nutritive media, gave clear results in the inoculation experiments.

The mixture of filtered emulsion and 25 per cent of serum from a normal *rhesus*, after half an hour in the vapour bath, injected into the brain of 5 mice killed them all. Four of them succumbed after 7 days and 1 after 10 days, presenting all the symptoms of typical encephalitis. Proceeding in the same way, but replacing the normal serum with the serum of an immunized *rhesus*, injection into the brain of 5 other mice did not kill them.

These experiments were repeated once, following the same method, with less decisive results, especially the injection of virus kept in the presence of *normal* serum for a half hour in the vapor bath. The death of all the mice subjected to the experiment after inoculation with this mixture had been expected. It was otherwise in two series of experiments in which normal serum was taken from—

1. A healthy *rhesus*, never having had yellow fever;
2. A man considered for the same reason as nonimmune to yellow fever infection.

Of five mice treated by the filtrate in the presence of the normal serum of the *rhesus*, one was resistant to intracerebral injection. It is probable that it was spontaneously refractory, an immunity found in 5 per cent of white mice.

Of 5 mice treated with the filtrate mixed with the normal serum of the man, only 2 died with a typical encephalitis, while 3 recovered. It is less probable that these also enjoyed a natural immunity.

It is necessary that these results be further studied in the light of different experiences. They raise the question of whether, in general, normal human serum when added in the proportion of 25 per cent to the filtrate, may develop a nonspecific neutralizing action in contact with the contained virus. If this is the case, it is necessary to—

1. Determine the limit of the proportion in which this nonspecific neutralization is no longer produced.
2. Verify whether there are not, perhaps, individual differences in human sera. It may be questioned, for example, whether the serum

used in the above experiments that was taken from a person who had collaborated extensively in yellow-fever experimentation might not, for this reason, have acquired some protective property.

All these problems still demand solution.

On the other hand, the mixture of serum of an immunized *rhesus* and of the filtrate, injected after half an hour of contact into the brain of 9 mice, caused the death from encephalitis of only one of them; 8 survived the cerebral inoculation.

The serum of Doctor Dinger, who had recovered from an attack of yellow fever contracted during his experiments in the laboratory, maintained in the presence of the virulent filtrate for half an hour and injected into 10 mice, protected them all against encephalitis; 7 survived, 1 died from an accident, and 2 died from unknown causes, showing no trace of encephalitis.

In brief, the filtrate of virulent mouse brains, emulsified in a peptone solution containing 10 per cent of rabbit serum, mixed with the serum of individuals immunized against yellow fever, and then inoculated into 24 mice, killed only one with typical encephalitis; the other 23 were protected by the serum; that is to say, the experiment succeeded in 96 per cent of cases, which indeed indicates the possibility that the white mouse can be used for experimental purposes to determine the regions where yellow fever persists in a clinically unrecognizable form.

RAT POPULATION ON DIESEL MOTOR BOATS

NOTE COMMUNICATED TO THE PERMANENT COMMITTEE OF THE OFFICE INTERNATIONAL D'HYGIENE PUBLIQUE, SESSION OF OCTOBER, 1930, BY SIR GEORGE S. BUCHANAN, C. B., SENIOR MEDICAL OFFICER, MINISTRY OF HEALTH, DELEGATE FROM GREAT BRITAIN [1]

It is generally admitted that oil tankers do not shelter rats; and, if this fact is frequently attributed to the dislike of rats for the odor of petroleum, other reasons can without doubt be noted, among which the most important are the following:

1. It is a rule that oil tankers are relatively new ships, and, because of the nature of the merchandise which they transport, they are of practically rat-proof construction.

2. The nature of the cargo, petroleum, neither furnishes food for rats nor offers them any place for nesting.

3. The majority of the special docks where petroleum is either taken or carried furnishes rats neither with nourishment nor shelter, and even in some cases the petrol pipe comes aboard without the ship lying at dock.

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[1] Translation. From the Monthly Bulletin, Office International d'Hygiene publique, June, 1931 pages 1082-1083.

Because of the frequent mention of this relative absence of rats on tankers, it is perhaps instructive to take cognizance of the observations made in some English ports.

At Liverpool, from January 1 to August 12, 1930, 29 Diesel motor ships were visited by the sanitary authorities of the port, and their observations established that these ships were not always free from rats. Moreover, according to the opinion of trappers and rat exterminators, it is not certain that rats dislike petroleum. These agents think that the principal causes for the presence of rats are the existence of food and temporary shelter. Of the 29 ships examined, however, 22 were without rats and without nests, and certificates of exemption from deratization were granted them. The 7 remaining ships were fumigated (6 with HCN and 1 with SO_2), and 37 dead rats were found, an average of 5.3 rats per ship fumigated. But this figure is deceptive; 32 rats were found on a single boat. This boat was in regular service between Liverpool and West Africa, and among the merchandise carried were great quantities of piassaba in bales and bags of cottonseed, which are two excellent means for the introduction of rats on board.

Within the same period 42 oil-burning ships were also examined, among which 21 showed neither rats nor rat shelters and received certificates of exemption from deratization. The remaining 21 were fumigated (10 with HCN and 11 with SO_2), and 140 rats were found on 20 of these ships. A ship which had been fumigated on request of the owners was not visited after the fumigation, but it had been concluded at the time of the examination that no rats would be found on board. The number of rats per ship fumigated was thus 6.7.

At London the inspectors are convinced that the odor of petroleum was of no consequence on Diesel motor boats, oil-burning ships, or tankers, but report that one finds only a few rats on Diesel motor boats. They give the following reasons for this:

1. These ships are of modern construction and offer no shelter for rats.
2. The holds are not subdivided and the engine rooms are well lighted.
3. They have no steam pipes which on other ships run from the engine to very nearly all parts of the ship along which rats pass from one compartment of the ship to another and which by reason of the arrangement of their coverings and isolation furnish an ideal shelter for rats.
4. These ships have no vast depths of hold, and mazout [the combustible residue from the distillation of crude petroleum] is regularly stored in reservoirs in the double bottoms.

At Swansea experience confirms the above opinion that on Diesel motor boats rat proofing is more important than the Diesel motor itself in reducing the rat population.

The general conclusions resulting from these inquiries are as follows:

1. That motor boats are of recent construction and offer limited or no shelter for rats when they are empty.

2. That the rats also enter these ships with cargo, if it offers them shelter and nourishment.

3. That it is not certain that rats have an aversion for petrol and that the small number found on these ships is actually due to the construction of the ships and to the measures taken to limit the number of the rat population.

PROVISIONAL BIRTH, DEATH, AND INFANT MORTALITY FIGURES, BIRTH REGISTRATION AREA, 1930

The Department of Commerce, through the Bureau of the Census, Division of Vital Statistics, announces that in 1930 in the birth registration area (exclusive of Utah) there were reported 2,190,047 live births, an increase in number of 32,507, or 1½ per cent over the number reported in the same area in 1929. The birth rate for 1930 was 18.9, the same as the rate for 1929. In 26 States birth rates were higher in 1930 than in 1929; in 12 States the rates were lower; and in 7 they remained the same. The highest birth rate (28.5) was for New Mexico. This State also attained the highest birth rate in 1929. The greatest increases in rates over 1929 were 1.9, 1.4, and 1.3 for Arkansas, New Mexico, and Arizona, respectively. The lowest birth rate (14.1) was for Oregon, which State also had the lowest rate in 1929.

The birth registration area (exclusive of Utah) had a death rate in 1930 of 11.3. This is 0.6 lower than the corresponding rate for 1929. When compared with 1929, 37 States had lower rates in the later year, 6 had higher rates, while the rates for 2 States did not change. The highest death rate (15.5) was for New Mexico and the lowest (7.9) was for North Dakota.

The infant mortality rate of 64.2 for 1930 was the lowest rate since the establishment of the birth registration area in 1915. Thirty-seven States had lower infant mortality rates in 1930 than in 1929. The greatest decreases were 17.1 and 10.2 for Arizona and Rhode Island, respectively. The highest rates were 144.9 for New Mexico and 116.2 for Arizona. The lowest rates were 48.4 for Washington, 49.2 for Nebraska, and 50 for Oregon.

Infant mortality rates are also shown in the accompanying table for 86 cities having 100,000 or more inhabitants in 1930. For only 21

of these cities were the rates higher in 1930 than in 1929. The highest rates were 108.8 for Chattanooga, 102.9 for Nashville, and 101.2 for Memphis. The lowest were 37.1 for Seattle and 39.8 for San Francisco.

The birth registration area in 1930 included all of the United States except South Dakota and Texas and included 94.7 per cent of the total population of the United States. Figures for Utah have been omitted from this summary because transcripts for 1930 have not yet been received from that State.

Area	Number, 1930			Rate per 1,000 estimated population				Infant mortality (deaths under 1 year per 1,000 births)	
	Births	Deaths		Births		Deaths			
		All ages	Under 1 year	1930	1929	1930	1929	1930	1929
Birth registration area [a]	2,190,047	1,316,447	140,518	18.9	18.8	11.3	11.9	64.2	67.6
STATES									
Alabama	63,757	30,420	4,597	21.0	21.0	11.5	12.4	72.1	73.6
Arizona	10,376	6,678	1,206	23.7	22.4	15.2	15.9	116.2	133.3
Arkansas	41,093	18,959	2,115	22.1	20.2	10.2	10.5	51.5	58.1
California	84,204	66,257	4,927	14.7	14.8	11.6	11.9	58.5	63.2
Colorado	18,814	13,205	1,773	18.1	17.4	12.7	12.5	94.2	91.4
Connecticut	27,582	17,290	1,542	17.1	17.1	10.7	11.5	55.9	64.4
Delaware	4,474	3,256	351	18.7	18.1	13.6	13.2	78.5	81.2
Florida	26,993	18,261	1,734	18.2	18.8	12.3	12.7	64.2	65.5
Georgia	60,689	35,188	4,097	20.9	20.1	12.1	12.2	77.4	76.3
Idaho	9,177	4,179	525	20.6	19.8	9.4	9.2	57.2	55.3
Illinois	128,121	83,593	7,079	16.7	17.0	10.9	11.6	55.3	61.4
Indiana	59,278	39,196	3,413	18.3	18.3	12.1	12.7	57.6	63.6
Iowa	42,733	26,231	2,299	17.3	17.1	10.6	10.4	53.8	52.6
Kansas	33,707	19,503	1,754	17.9	17.4	10.4	10.4	52.0	57.6
Kentucky	59,261	29,544	3,870	22.6	21.7	11.3	12.0	65.3	70.9
Louisiana	42,890	24,724	3,363	20.3	20.3	11.7	11.9	78.4	74.0
Maine	16,199	11,082	1,225	20.3	20.0	13.9	14.3	75.6	77.4
Maryland	30,251	21,567	2,277	18.5	18.5	13.2	13.5	75.3	79.9
Massachusetts	73,551	49,310	4,296	17.3	17.5	11.6	12.3	58.4	61.8
Michigan	99,326	51,638	6,215	20.4	20.8	10.6	11.8	62.6	66.4
Minnesota	47,418	25,711	2,478	18.5	18.3	10.0	10.1	52.3	51.2
Mississippi	48,163	24,125	3,256	23.9	22.9	12.0	13.0	67.6	72.1
Missouri	62,165	43,080	3,617	17.1	16.9	11.9	12.3	58.7	62.1
Montana	9,971	5,411	582	18.5	18.7	10.1	10.7	58.4	64.0
Nebraska	27,004	13,289	1,328	19.6	19.4	9.6	9.8	49.2	51.7
Nevada	1,332	1,161	87	14.6	11.2	12.8	13.3	65.3	67.2
New Hampshire	8,340	6,322	508	17.9	17.6	13.6	14.1	60.9	68.2
New Jersey	68,321	48,598	3,858	16.8	17.2	10.7	11.6	56.5	60.1
New Mexico	12,116	6,576	1,756	28.5	27.1	15.5	15.4	144.9	145.5
New York	216,046	147,436	12,572	17.1	17.5	11.7	12.4	58.2	60.8
North Carolina	76,772	35,783	6,033	24.1	24.7	11.2	11.8	78.6	79.1
North Dakota	14,783	5,367	897	21.7	21.6	7.9	8.0	60.7	67.2
Ohio	117,526	76,232	7,173	17.6	17.7	11.4	12.4	61.0	68.8
Oklahoma	42,504	19,679	2,577	17.7	16.8	8.2	9.0	60.6	70.2
Oregon	13,468	10,545	674	14.1	14.1	11.0	11.3	50.0	47.9
Pennsylvania	189,458	111,616	12,243	19.6	19.8	11.6	12.3	64.6	70.5
Rhode Island	12,191	8,607	753	17.7	18.0	11.6	13.1	61.8	72.0
South Carolina	40,460	22,434	3,588	23.3	22.7	12.9	13.3	88.7	91.0
Tennessee	52,652	29,993	3,985	20.1	19.5	11.4	12.2	75.7	77.1
Vermont	6,934	4,687	448	19.3	18.7	13.0	14.7	64.6	65.8
Virginia	54,702	30,317	4,218	22.6	22.4	12.5	13.0	77.1	78.8
Washington	22,999	16,678	1,113	14.7	14.6	10.6	10.6	48.4	49.0
West Virginia	41,614	18,222	3,361	24.0	23.8	10.5	10.6	80.8	77.6
Wisconsin	56,788	30,558	3,153	19.3	19.0	10.4	10.7	55.5	59.6
Wyoming	4,471	2,080	309	19.8	19.8	9.2	9.0	69.1	70.3

[a] Exclusive of Utah; the 1930 data for this State are incomplete.

Area	Number, 1930			Rate per 1,000 estimated population				Infant mortality (deaths under 1 year per 1,000 births)	
	Births	Deaths		Births		Deaths			
		All ages	Under 1 year	1930	1929	1930	1929	1930	1929
CITIES HAVING 100,000 INHABITANTS OR MORE IN 1930									
Akron	5,248	2,002	290	20.5	22.3	7.8	9.4	55.3	64.0
Albany	2,624	1,893	157	20.5	20.0	14.8	16.1	59.8	70.3
Atlanta	5,301	4,199	493	19.5	19.2	15.5	15.7	93.0	93.5
Baltimore	14,994	11,238	981	18.6	18.7	13.9	14.5	65.4	72.6
Birmingham	5,204	3,548	404	19.9	21.4	13.6	15.3	77.6	88.3
Boston	18,060	11,018	1,252	23.1	23.1	14.1	15.0	69.3	68.9
Bridgeport	3,102	1,599	144	21.1	20.8	10.9	11.9	46.4	70.9
Buffalo	11,560	7,393	772	20.1	20.6	12.9	13.9	66.8	66.2
Cambridge	2,523	1,347	119	22.2	22.9	11.8	12.6	47.2	57.4
Camden	3,013	1,590	207	25.4	25.1	13.4	14.1	68.7	71.2
Canton	2,087	1,020	133	19.8	18.9	9.7	11.1	63.7	66.4
Chattanooga	2,335	1,883	254	19.4	26.7	15.7	20.9	108.8	83.0
Chicago	58,083	35,316	3,112	17.1	17.7	10.4	11.2	53.6	60.2
Cincinnati	8,702	7,004	566	19.2	19.8	15.5	16.8	65.0	76.8
Cleveland	17,842	9,906	974	19.8	19.6	11.0	12.2	54.6	61.2
Columbus	5,357	4,469	380	18.4	18.4	15.3	14.5	70.9	71.5
Dayton	3,638	2,227	200	18.0	17.7	11.0	11.4	55.0	66.5
Denver	5,184	4,340	480	18.0	16.7	15.0	14.6	92.6	83.9
Des Moines	2,748	1,718	141	19.2	20.0	12.0	11.9	51.3	52.8
Detroit	32,967	14,738	2,127	20.8	22.3	9.3	10.9	64.5	69.1
Duluth	1,927	1,185	119	19.0	19.0	11.7	11.8	61.8	45.8
Elizabeth	2,616	1,325	117	22.7	22.6	11.5	12.4	44.7	63.3
Erie	2,524	1,308	125	21.7	20.7	11.2	12.1	49.5	56.8
Evansville	1,770	1,295	109	17.2	16.8	12.6	12.6	61.6	74.3
Fall River	2,202	1,322	142	19.1	19.5	11.5	13.2	64.5	66.0
Flint	4,169	1,399	284	26.4	29.0	8.9	10.6	68.1	72.3
Fort Wayne	2,270	1,274	124	19.6	18.6	11.0	11.7	54.6	60.5
Gary	2,301	975	166	22.7	22.1	9.6	10.2	72.1	72.3
Grand Rapids	3,421	1,697	165	20.2	20.8	10.0	10.3	48.2	53.4
Hartford	4,298	2,148	267	26.1	25.5	13.0	13.8	62.1	67.6
Indianapolis	6,806	5,196	431	18.6	19.2	14.2	14.7	63.3	67.7
Jacksonville	2,448	1,976	160	18.8	20.4	15.2	16.6	65.4	73.4
Jersey City	5,881	3,573	422	18.5	19.1	11.3	12.4	71.8	67.1
Kansas City, Kans	2,362	1,677	152	19.3	18.4	13.7	13.4	64.4	72.5
Kansas City, Mo	6,501	5,304	441	16.2	15.8	13.2	13.7	67.8	74.4
Knoxville	2,407	1,500	193	22.6	21.5	14.1	13.5	80.2	80.4
Long Beach	2,096	1,490	90	14.6	15.1	10.4	10.8	42.9	38.7
Los Angeles	17,921	14,028	1,095	14.3	14.5	11.2	11.4	61.1	64.5
Louisville	5,730	4,387	385	18.6	19.8	14.3	15.1	67.2	71.5
Lowell	1,998	1,323	155	19.8	19.4	13.1	13.6	77.6	69.1
Lynn	1,813	1,058	100	17.7	18.3	10.3	11.3	55.2	56.3
Memphis	4,903	4,398	496	19.3	21.6	17.3	18.9	101.2	95.3
Miami	2,022	1,232	117	18.2	16.5	11.1	9.5	57.9	47.8
Milwaukee	11,606	5,568	672	20.0	20.9	9.6	10.7	57.9	74.5
Minneapolis	8,116	5,056	454	17.4	17.3	10.8	10.8	55.9	49.2
Nashville	3,460	2,511	356	22.4	21.7	16.3	17.8	102.9	98.1
Newark, N. J	9,821	5,263	500	22.2	22.6	11.9	12.8	50.9	57.7
New Bedford	1,988	1,243	107	17.7	18.0	11.0	11.9	53.8	65.9
New Haven	3,428	2,117	161	21.1	20.8	13.0	13.4	47.0	47.0
New Orleans	9,337	8,032	820	20.3	20.7	17.4	17.7	87.8	79.7
New York City	122,247	74,907	6,958	17.6	18.1	10.8	11.3	56.9	58.9
Norfolk	2,254	1,763	160	17.4	17.5	13.6	15.0	71.0	87.2
Oakland	4,165	3,178	189	14.6	15.0	11.1	11.3	45.4	46.7
Oklahoma City	3,735	2,110	310	19.9	16.2	11.2	10.5	83.0	66.5
Omaha	4,524	2,819	225	21.1	20.2	13.1	13.4	49.7	58.5
Paterson	3,051	1,669	158	22.0	21.6	12.0	13.4	51.8	55.5
Peoria	1,980	1,301	125	18.7	18.6	12.3	13.2	63.1	58.4
Philadelphia	35,818	24,517	2,115	18.3	18.1	12.5	13.0	59.0	61.7
Pittsburgh	14,994	9,311	1,029	22.3	22.1	13.9	14.5	68.6	73.5
Portland, Oreg	4,249	3,675	174	14.0	14.1	12.1	12.6	41.0	42.5
Providence	5,709	3,258	299	22.5	22.3	12.9	14.4	52.4	65.9
Reading	1,699	1,236	111	15.3	15.9	11.1	11.8	65.3	76.7
Richmond	3,580	2,738	263	19.5	19.7	14.9	16.1	73.5	81.0
Rochester	5,660	3,786	289	17.2	18.0	11.5	12.2	51.1	63.0
St. Louis	14,496	11,475	785	17.6	18.3	13.9	14.5	54.2	59.1

Area	Number, 1930			Rate per 1,000 estimated population				Infant mortality (deaths under 1 year per 1,000 births)	
	Births	Deaths		Births		Deaths			
		All ages	Under 1 year	1930	1929	1930	1929	1930	1929
CITIES HAVING 100,000 INHABITANTS OR MORE IN 1930—continued									
St. Paul	5,085	2,880	218	18.7	19.2	10.6	10.9	42.9	46.1
San Diego	2,528	2,164	124	16.9	17.4	14.5	15.0	49.1	48.9
San Francisco	7,822	8,311	311	12.3	12.3	13.0	13.0	39.8	49.7
Scranton	2,814	1,842	193	19.6	19.2	12.8	14.2	68.6	82.6
Seattle	5,280	4,008	196	14.4	14.3	10.9	11.1	37.1	45.9
South Bend	2,013	954	96	19.2	20.1	9.1	10.2	47.7	62.4
Spokane	2,011	1,447	95	17.4	17.4	12.5	12.9	47.2	55.9
Springfield, Mass	3,105	1,771	164	20.6	20.5	11.8	12.7	52.8	58.9
Syracuse	4,255	2,461	241	20.3	20.4	11.7	12.7	56.6	55.6
Tacoma	1,876	1,371	83	17.5	18.0	12.8	12.2	44.2	32.4
Tampa	1,830	1,175	106	18.0	19.1	11.5	11.6	57.9	61.4
Toledo	5,535	3,681	311	19.0	19.7	12.6	13.7	56.2	69.6
Trenton	2,854	1,893	224	23.1	22.1	15.3	15.5	78.5	71.8
Tulsa	2,366	1,410	182	16.7	16.2	9.9	9.7	76.9	65.0
Utica	1,870	1,510	126	18.4	18.5	14.8	16.6	67.4	74.0
Washington, D. C	9,373	7,399	663	19.2	18.4	15.2	15.4	70.7	70.7
Wichita	2,280	1,334	130	20.4	20.3	11.9	12.4	57.0	59.6
Wilmington, Del	2,305	1,556	163	21.6	20.2	14.6	13.4	70.7	74.9
Worcester	3,638	2,498	228	18.6	19.4	12.8	12.8	62.7	59.3
Yonkers	2,155	1,131	101	15.9	16.6	8.3	9.4	46.9	64.4
Youngstown	3,777	1,783	218	22.1	23.7	10.5	12.3	57.7	71.7

COURT DECISION RELATING TO PUBLIC HEALTH

Ordinance classifying milk industry held valid.—(Oklahoma Supreme Court; Stephens et al. *v.* Oklahoma City et al., 1 P. (2d) 367; decided July 7, 1931.) An ordinance of Oklahoma City classified the milk industry into three classes, namely, inspected dairies, farm dairies, and pasteurizing plants. Inspected dairies were those which sold raw milk to consumers, while farm dairies did not sell such milk to consumers but delivered it to pasteurizing plants for treatment prior to sale for consumption. The license fees charged inspected dairies were higher than those charged farm dairies and pasteurizing plants, the fees for the former ranging from $10 to $30 per year, according to the number of cows in the herd, while the annual fee for farm dairies was $1. The plaintiffs brought suit to enjoin the defendants from enforcing the said ordinance. The contention of the plaintiffs was that the ordinance was invalid because there was an unreasonable, arbitrary, and unjust discrimination between the amount of fees provided to be charged operators of inspected dairies and the amount of fees provided to be charged operators of pasteurizing plants and farm dairies. The trial court rendered judgment in favor of the defendants, and on appeal this judgment was affirmed by the supreme court.

The appellate court stated that it was agreed that the ordinance was a regulatory one and not for the purpose of raising revenue, and that the license fees charged could not exceed the expense of issuing the license and regulating the business. After setting forth at length

the greater amount of labor involved in the inspection and regulation of inspected dairies than that involved in the inspection of farm dairies and pasteurizing plants, the court said that the record showed that the cost of such inspection and regulation of inspected dairies was considerably in excess of the amounts charged, and held that no constitutional or statutory right of the plaintiffs would be infringed by the enforcement of the ordinance.

DEATHS DURING WEEK ENDED SEPTEMBER 12, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended September 12, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended September 12, 1931	Corresponding week, 1930
Policies in force	74, 937, 114	75, 601, 457
Number of death claims	9, 817	12, 793
Death claims per 1,000 policies in force, annual rate	6. 8	8. 8
Death claims per 1,000 policies, first 37 weeks of year, annual rate	9. 9	9. 8

Deaths [1] from all causes in certain large cities of the United States during the week ended September 12, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Sept. 12, 1931				Corresponding week, 1930		Death rate [2] for the first 37 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (81 cities)	7, 023	10. 3	732	[4] 57	9. 7	682	12. 2	12. 1
Akron	37	7. 5	3	30	5. 5	7	7. 9	7. 9
Albany [5]	33	13. 3	0	0	9. 4	1	13. 9	15. 1
Atlanta	63	11. 8	6	61	12. 9	7	15. 4	15. 9
White	25		3	48		4		
Colored	38	(6)	3	86	(6)	3	(6)	(6)
Baltimore [5]	192	12. 3	29	98	10. 0	15	14. 7	14. 1
White	127		16	69		9		
Colored	65	(6)	13	203	(6)	6	(6)	(6)
Birmingham	58	11. 2	5	50	7. 4	3	13. 9	13. 9
White	31		4	69		3		
Colored	27	(6)	1	24	(6)	0	(6)	(6)
Boston	198	13. 1	23	66	11. 1	20	14. 4	14. 3
Bridgeport	19	6. 7	4	66	8. 5	2	11. 3	11. 3
Buffalo	143	12. 8	18	74	11. 4	14	13. 4	13. 2
Cambridge	23	10. 5	2	40	7. 8	1	12. 4	11. 8
Camden	25	11. 0	3	52	9. 7	4	14. 6	13. 8
Canton	19	9. 3	0	0	7. 9	1	10. 4	10. 2
Chicago [5]	566	8. 5	60	53	8. 7	55	10. 9	10. 5
Cincinnati	123	14. 0	11	66	14. 2	14	16. 2	15. 7
Cleveland	176	10. 1	21	61	9. 0	12	11. 4	11. 3
Columbus	68	12. 0	8	78	10. 2	5	13. 9	15. 9
Dallas	61	11. 7	7		8. 3	4	11. 5	11. 8
White	46		6			3		
Colored	15	(6)	1		(6)	1	(6)	(6)
Dayton	37	9. 3	12	168	11. 6	5	11. 9	10. 5
Denver	74	13. 2	10	97	14. 6	19	14. 2	15. 0

Footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended September 12, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Sept. 12, 1931				Corresponding week, 1930		Death rate [2] for the first 37 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Des Moines	24	8.7	3	53	11.3	5	11.2	12.0
Detroit	224	7.1	29	46	7.7	28	8.4	9.5
Duluth	29	14.9	4	98	10.8	2	11.2	11.2
El Paso	33	16.4	6	--------	13.7	5	16.3	17.9
Erie	18	8.0	1	19	7.6	3	10.8	11.3
Fall River [5] [7]	16	7.2	2	45	9.5	2	11.5	12.1
Flint	18	5.7	3	38	7.6	5	7.1	9.3
Fort Worth	34	10.6	5	--------	10.8	2	11.0	11.1
White	28	--------	5	--------	--------	2	--------	--------
Colored	6	(6)	0	--------	(6)	0	(6)	(6)
Grand Rapids	27	8.2	3	44	7.4	2	9.2	10.4
Houston	54	9.1	8	--------	10.9	9	11.2	12.2
White	32	--------	5	--------	--------	9	--------	--------
Colored	22	(6)	3	--------	(6)	0	(6)	(6)
Indianapolis	96	13.5	8	66	10.4	12	14.1	14.9
White	81	--------	5	47	--------	9	--------	--------
Colored	15	(6)	3	201	(6)	3	(6)	(6)
Jersey City	56	9.2	4	36	7.2	6	11.7	11.4
Kansas City, Kans.	19	8.1	0	0	11.5	3	12.7	11.6
White	12	--------	0	0	--------	3	--------	--------
Colored	7	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo.	76	9.7	6	46	13.6	11	13.3	13.4
Long Beach	21	7.2	0	0	9.1	0	9.9	10.0
Los Angeles	294	11.6	31	90	9.7	21	10.8	11.1
Louisville	74	12.5	7	60	11.3	13	14.6	13.9
White	55	--------	4	39	--------	9	--------	--------
Colored	19	(6)	3	199	(6)	4	(6)	(6)
Lowell [7]	31	16.0	6	153	9.3	0	12.8	13.7
Lynn	19	9.6	1	26	8.7	2	9.8	10.7
Memphis	79	15.9	10	106	18.3	12	16.7	17.7
White	41	--------	5	83	--------	9	--------	--------
Colored	38	(6)	5	145	(6)	3	(6)	(6)
Miami	24	11.1	2	51	10.8	2	11.9	11.4
White	18	--------	0	0	--------	1	--------	--------
Colored	6	(6)	2	177	(6)	1	(6)	(6)
Milwaukee	86	7.6	9	39	7.8	9	9.5	9.7
Minneapolis	85	9.4	11	71	10.1	7	11.5	10.7
Nashville	61	20.5	9	134	14.2	4	17.1	16.9
White	40	--------	5	100	--------	3	--------	--------
Colored	21	(6)	4	230	(6)	1	(6)	(6)
New Bedford [7]	13	6.0	0	0	8.3	0	12.3	11.0
New Haven	53	17.0	3	57	10.6	0	12.6	13.1
New Orleans	147	16.4	16	88	14.2	5	17.2	17.6
White	75	--------	5	41	--------	4	--------	--------
Colored	72	(6)	11	179	(6)	1	(6)	(6)
New York	1,239	9.1	116	48	8.5	104	11.5	11.0
Bronx Borough	179	7.0	13	29	6.9	10	8.4	8.1
Brooklyn Borough	413	8.2	50	53	7.7	44	10.5	10.1
Manhattan Borough	459	13.2	38	65	11.9	40	17.4	16.4
Queens Borough	143	6.5	10	27	5.9	8	7.4	7.2
Richmond Borough	45	14.4	5	90	13.1	2	14.0	14.7
Newark, N. J.	84	9.8	5	26	8.7	6	11.8	12.2
Oakland	44	7.8	7	89	10.9	9	10.5	11.1
Oklahoma City	28	7.4	4	55	12.0	8	11.1	10.7
Omaha	71	17.1	9	101	7.8	2	14.1	13.8
Paterson	26	9.8	4	69	6.4	4	13.6	12.4
Peoria	22	10.6	6	158	8.9	4	12.8	12.6
Philadelphia	371	9.8	44	64	10.5	53	13.4	12.8
Pittsburgh	157	12.1	20	69	11.1	19	14.8	14.0
Portland, Oreg.	64	10.9	3	36	8.8	1	11.7	12.3
Providence	40	8.2	2	18	10.5	4	13.0	13.2
Richmond	36	10.2	3	44	10.0	6	15.9	15.1
White	21	--------	1	22	--------	2	--------	--------
Colored	15	(6)	2	87	(6)	4	(6)	(6)
Rochester	58	9.1	6	55	6.8	8	12.1	11.6
St. Louis	201	12.7	21	71	10.6	10	15.6	14.5

Footnotes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended September 12, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Sept. 12, 1931				Corresponding week, 1930		Death rate [2] for the first 37 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
St. Paul	49	9.3	1	10	10.7	5	11.0	10.2
Salt Lake City [5]	28	10.2	4	60	6.3	2	12.3	12.5
San Antonio	59	12.8	8	-------	12.1	7	14.9	17.2
San Diego	32	10.7	2	41	14.3	2	13.7	14.6
San Francisco	165	13.2	7	46	13.4	10	13.2	13.1
Schenectady	17	9.2	2	59	5.4	1	10.7	11.3
Seattle	61	8.6	0	0	10.7	2	11.5	11.0
Somerville	17	8.4	1	37	7.5	1	9.2	9.9
South Bend	17	8.2	3	75	8.9	1	8.1	9.0
Spokane	43	19.3	1	26	14.0	5	12.5	12.5
Springfield, Mass	32	11.0	4	61	8.7	1	12.0	12.3
Syracuse	48	11.7	8	95	7.7	6	11.8	11.7
Tacoma	26	12.6	2	51	10.2	1	12.1	12.7
Toledo	47	8.3	3	28	10.0	8	12.1	12.7
Trenton	43	18.1	1	17	12.7	8	16.9	16.9
Utica	25	12.7	1	26	14.8	1	14.2	15.1
Washington, D. C	135	14.3	12	66	10.3	11	16.1	15.3
White	87	-------	5	41	-------	4	-------	-------
Colored	48	(6)	7	120	(6)	7	(6)	(6)
Waterbury	18	9.3	2	60	8.3	2	9.8	10.0
Wilmington, Del. [7]	25	12.2	4	86	8.8	1	14.2	14.5
Worcester	30	7.9	3	41	6.7	1	12.3	13.0
Yonkers	15	5.6	1	26	5.0	2	8.8	8.2
Youngstown	24	7.2	3	42	9.2	7	10.4	10.2

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 76 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended September 19, 1931, and September 20, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 19, 1931, and September 20, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930	Week ended Sept. 19, 1931	Week ended Sept 20, 1930	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930
New England States:								
Maine	3	4	1	--------	3	90	0	0
New Hampshire	--------	7	--------	--------	--------	1	0	0
Vermont	--------	--------	--------	--------	1	1	0	0
Massachusetts	30	38	4	--------	16	17	1	3
Rhode Island	5	5	--------	--------	8	3	0	0
Connecticut	3	3	1	3	3	3	0	0
Middle Atlantic States:								
New York	45	54	[1] 8	[1] 5	59	42	15	8
New Jersey	11	38	--------	1	19	14	2	4
Pennsylvania	60	80	--------	--------	61	45	9	5
East North Central States:								
Ohio	25	19	7	7	21	12	1	0
Indiana	11	23	19	--------	6	4	1	5
Illinois	45	101	147	8	33	9	3	4
Michigan	20	36	3	1	20	19	9	12
Wisconsin	12	4	12	15	14	18	4	0
West North Central States:								
Minnesota	9	10	--------	2	11	2	1	0
Iowa	8	6	--------	--------	3	6	1	1
Missouri	32	15	1	1	3	10	3	2
North Dakota	1	4	--------	--------	2	--------	1	0
South Dakota	1	6	--------	2	3	--------	0	0
Nebraska	6	6	--------	2	3	15	3	3
Kansas	19	6	1	2	10	4	0	2
South Atlantic States:								
Delaware	--------	--------	--------	--------	--------	1	0	0
Maryland [2]	21	7	3	2	6	3	2	0
District of Columbia	13	8	1	--------	--------	7	0	0
Virginia [3]	--------	--------	--------	--------	--------	--------	--------	--------
West Virginia	23	25	15	1	7	10	1	0
North Carolina	105	81	--------	8	12	1	1	2
South Carolina	19	41	142	186	4	--------	0	0
Georgia [3]	39	18	6	11	4	26	2	1
Florida [3]	4	5	--------	--------	1	2	0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 10 cases: 1 case in Virginia; 4 cases in Georgia; 3 cases in Florida; 1 case in Alabama; and 1 case in Texas.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 19, 1931, and September 20, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930
East South Central States:								
Kentucky	125				37		0	0
Tennessee	79	22	5	2	6	7	1	2
Alabama [3]	77	26	10	4		5	2	1
Mississippi	111	15					0	0
West South Central States:								
Arkansas	38	3		2	5		0	1
Louisiana	23	18	8	1	2	1	0	0
Oklahoma [4]	50	22	13	8	1	1	0	0
Texas [3]	20	11	1	3		2	0	0
Mountain States:								
Montana					12	1	0	0
Idaho					1	2	1	0
Wyoming		1					0	0
Colorado	3	6			2	2	0	1
New Mexico	7	4			1	3	0	1
Arizona	3	8	4	1	1	4	0	2
Utah [2]	2		6	8			1	3
Pacific States:								
Washington	4	4			6	6	0	1
Oregon	3	1	12	7	10	23	0	0
California	34	16	27	11	73	41	3	3

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930
New England States:								
Maine	5	18	3	9	0	0	6	6
New Hampshire	5	3	0	1	0	0	0	2
Vermont	7	0	3	1	1	0	0	0
Massachusetts	139	26	72	59	0	0	11	12
Rhode Island	12	6	10	4	0	0	3	3
Connecticut	101	8	7	17	0	0	8	0
Middle Atlantic States:								
New York	430	61	125	69	0	0	50	31
New Jersey	98	2	32	37	0	0	6	6
Pennsylvania	25	12	91	101	0	0	77	84
East North Central States:								
Ohio	5	42	93	62	1	15	55	44
Indiana	1	13	26	44	4	16	12	15
Illinois	51	27	87	92	0	18	57	46
Michigan	170	13	67	70	1	7	16	47
Wisconsin	74	8	13	32	0	5	8	11
West North Central States:								
Minnesota	76	18	26	26	2	1	12	4
Iowa	7	18	13	13	1	4	3	5
Missouri	1	14	28	14	13	1	28	28
North Dakota	2	3	3	3	0	0	1	7
South Dakota	2	3	7	3	7	2	1	4
Nebraska	5	22	10	12	0	13	2	1
Kansas	0	65	22	32	0	3	12	9
South Atlantic States:								
Delaware	0	1	2	4	0	0	2	3
Maryland [2]	4	1	32	11	0	0	26	50
District of Columbia	0	0	4	3	0	0	2	4
Virginia [3]	4							
West Virginia	4	1	21	21	0	6	89	51
North Carolina	7	1	74	65	0	1	46	33
South Carolina	0	2	15	18	0	0	39	49
Georgia [3]	3	3	15	11	0	0	50	32
Florida [3]	0	0	5	2	0	0	7	4

[2] Week ended Friday.
[3] Typhus fever, 1931, 10 cases: 1 case in Virginia; 4 cases in Georgia; 3 cases in Florida; 1 case in Alabama; and 1 case in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 19, 1931, and September 20, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930	Week ended Sept. 19, 1931	Week ended Sept. 20, 1930
East South Central States:								
Kentucky	0	0	37	25	0	2	76	37
Tennessee	6	1	35	23	7	1	52	37
Alabama [3]	1	1	49	27	2	9	23	49
Mississippi	2	2	17	8	2	2	26	28
West South Central States:								
Arkansas	0	1	10	7	0	4	50	28
Louisiana	3	8	11	13	6	2	53	34
Oklahoma [4]	1	7	21	15	2	5	61	46
Texas [3]	0	5	22	6	4	2	27	20
Mountain States:								
Montana	6	1	4	7	1	0	5	7
Idaho	0	1	4	2	1	0	0	1
Wyoming	0	12	4	2	0	0	1	1
Colorado	0	7	10	7	0	1	5	10
New Mexico	0	0	4	2	0	0	12	21
Arizona	0	1	1	4	0	0	6	11
Utah [1]	0	0	4	2	0	0	2	0
Pacific States:								
Washington	5	0	28	29	9	6	6	1
Oregon	2	0	6	8	1	0	2	4
California	8	66	53	34	4	3	31	20

[1] Week ended Friday.
[3] Typhus fever, 1931, 10 cases: 1 case in Virginia; 4 cases in Georgia; 3 cases in Florida; 1 case in Alabama; and 1 case in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July, 1931										
Hawaii Territory	4	10			94		4	3	0	7
Kansas	2	30	7		60	1	4	54	68	37
August, 1931										
Maine	1	8	2		15		25	34	1	11
Maryland	1	45	5	2	37		6	41	0	113
Michigan	14	66		2	92		216	260	21	45
Minnesota	7	33	5	1	19		132	74	8	27
New Mexico		7		21	1	2	3	14	1	16
North Carolina	5	132	5		76	146	28	132	2	212
Rhode Island	2	8			96		79	26	0	16
Vermont		8			18		0	48	19	0
West Virginia	4	37	29		160		23	58	3	178

July, 1931

	Cases
Actinomycosis:	
Hawaii Territory	1
Chicken pox:	
Hawaii Territory	12
Kansas	33
Conjunctivitis (follicular):	
Hawaii Territory	4
German measles:	
Kansas	5
Hookworm disease:	
Hawaii Territory	11
Impetigo contagiosa:	
Kansas	4
Leprosy:	
Hawaii Territory	4
Mumps:	
Hawaii Territory	15
Kansas	149

	Cases
Paratyphoid fever:	
Kansas	5
Septic sore throat:	
Kansas	6
Tetanus:	
Hawaii Territory	3
Kansas	3
Undulant fever:	
Kansas	8
Vincent's angina:	
Kansas	8
Whooping cough:	
Hawaii Territory	2
Kansas	146
August, 1931	
Anthrax:	
North Carolina	1
Chicken pox:	
Maine	13
Maryland	16
Michigan	101
Minnesota	47
New Mexico	3
North Carolina	5
Rhode Island	3
Vermont	21
West Virginia	24
Diarrhea:	
Maryland	86
Dysentery:	
Maryland	63
Minnesota (amebic)	1
New Mexico	2
German measles:	
Maryland	3
New Mexico	1
North Carolina	15
Rhode Island	2
Impetigo contagiosa:	
Maryland	7
Lead poisoning:	
Maine	1
Lethargic encephalitis:	
Maine	3
Maryland	2
Michigan	4
Minnesota	1
Mumps:	
Maine	33
Maryland	22
Michigan	127
Mumps—Continued.	
New Mexico	3
Rhode Island	11
Vermont	29
Ophthalmia neonatorum:	
North Carolina	2
Rhode Island	1
Paratyphoid fever:	
New Mexico	1
North Carolina	10
West Virginia	1
Rabies in animals:	
Maryland	5
Rhode Island	1
Rocky Mountain spotted or tick fever:	
Maryland	9
Septic sore throat:	
Maine	3
Maryland	4
Michigan	3
New Mexico	1
North Carolina	8
Tetanus:	
Maine	1
Maryland	5
Trachoma:	
Minnesota	1
Tularaemia:	
Minnesota	1
New Mexico	1
Typhus fever:	
Maryland	6
North Carolina	5
Undulant fever:	
Maryland	9
Michigan	1
Minnesota	6
Vermont	2
Vincent's angina:	
Maine	19
Maryland	7
Whooping cough:	
Maine	73
Maryland	462
Michigan	1,005
Minnesota	90
New Mexico	28
North Carolina	388
Rhode Island	21
Vermont	69
West Virginia	211

TYPHOID FEVER OUTBREAK AT CLEVELAND, OHIO

Reports received weekly from Cleveland, Ohio, show 3 cases of typhoid fever with one death in Cleveland for the week ended September 12, 1931, while for the week ended September 19, 1931, there were 130 cases with 7 deaths. According to press reports this outbreak occurred at the Cleveland State Hospital, and is believed to have been traced to a "carrier."

TYPHUS FEVER PATIENT REMOVED FROM VESSEL AT NEW ORLEANS

According to information received under date of September 23, 1931, a case of typhus fever occurred on the American S. S. *Atenas.* and the patient was removed from the vessel at New Orleans (La.) Quarantine Station. It was stated that the case originated at Heredia, Costa Rico, but no information was given as to the port at which the patient had boarded the vessel. The vessel arrived at Habana on the 18th and sailed from that port on the 19th.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of July, 1931, by departments of health of certain States to other State health departments

Disease	California	Connecticut	Illinois	Kansas	Maine	Massachusetts	Minnesota	New York
Diptheria		1						
Gonorrhea							1	
Measles								1
Mumps								1
Poliomyelitis		2			1			
Scarlet fever							1	
Smallpox	1							1
Syphilis				7			1	
Tuberculosis	2	2	16				26	2
Tulaaremia	1							
Typhoid fever	2					1		
Whooping cough								2

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,480,000. The estimated population of the 91 cities reporting deaths is more than 31,935,000. The esitmated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended September 12, 1931, and September 13, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,044	878	
98 cities	224	280	422
Measles:			
45 States	394	392	
98 cities	92	99	
Meningococcus meningitis:			
46 States	49	75	
98 cities	26	35	
Poliomyelitis:			
46 States	1,158	491	
Scarlet fever:			
46 States	1,129	994	
98 cities	313	314	313
Smallpox:			
46 States	85	141	
98 cities	8	21	8
Typhoid fever:			
46 States	1,050	978	
98 cities	146	166	157
Deaths reported			
Influenza and pneumonia:			
91 cities	363	342	
Smallpox:			
91 cities	0	0	

City reports for week ended September 12, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	0	----------	0	0	0	0
New Hampshire:								
Concord	0	0	0	----------	0	0	0	0
Nashua	0	0	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	1	0	0
Burlington	0	1	1	----------	0	0	0	0
Massachusetts:								
Boston	1	14	19	5	0	4	2	12
Fall River	0	1	0	----------	1	0	0	0
Springfield	0	1	0	----------	0	0	1	0
Worcester	2	3	2	----------	0	0	10	2
Rhode Island:								
Pawtucket	0	0	0	----------	0	0	0	0
Providence	0	3	0	1	0	6	8	3
Connecticut:								
Bridgeport	2	2	2	----------	0	0	0	1
Hartford	1	1	1	----------	0	0	0	4
New Haven	0	1	0	----------	0	1	1	2
MIDDLE ATLANTIC								
New York:								
Buffalo	1	7	0	----------	0	1	1	8
New York	12	71	45	4	6	4	11	105
Rochester	1	2	0	----------	0	6	0	1
Syracuse	1	1	0	----------	0	0	0	2
New Jersey:								
Camden	0	1	1	----------	0	0	0	0
Newark	1	7	4	1	0	2	3	0
Trenton	0	1	0	----------	0	0	1	1
Pennsylvania:								
Philadelphia	3	25	2	2	2	1	6	20
Pittsburgh	0	10	6	----------	2	4	4	7
Reading	1	1	1	----------	0	0	0	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	4	1	----------	0	0	0	6
Cleveland	4	19	2	4	0	3	5	6
Columbus	1	2	11	----------	0	0	3	1
Toledo	0	3	6	1	0	11	0	0
Indiana:								
Fort Wayne	0	1	1	----------	0	0	0	1
Indianapolis	0	2	1	----------	0	0	4	5
South Bend	0	0	0	----------	0	0	0	2
Terre Haute	0	0	0	----------	0	0	0	0
Illinois:								
Chicago	20	50	23	5	2	12	3	21
Springfield	0	1	0	----------	0	0	0	1
Michigan:								
Detroit	2	26	12	----------	3	1	7	8
Flint	1	1	0	----------	0	0	3	2
Grand Rapids	0	1	0	----------	0	2	1	1
Wisconsin:								
Kenosha	0	0	0	----------	0	0	7	1
Madison	0	0	1	----------	----------	1	3	----------
Milwaukee	6	6	1	----------	0	3	3	4
Racine	0	1	1	----------	0	1	7	0
Superior	0	0	0	----------	0	0	0	1

City reports for week ended September 12, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
WEST NORTH CENTRAL								
Minnesota:								
Duluth	3	0	0	---	0	0	0	0
Minneapolis	2	11	2	---	0	4	7	4
St. Paul	4	5	3	---	0	1	0	1
Iowa:								
Davenport	0	1	0	---	---	0	0	---
Des Moines	0	0	0	---	---	0	0	---
Sioux City	1	0	1	---	---	0	1	---
Waterloo	1	1	0	---	---	0	3	---
Missouri:								
Kansas City	0	1	2	---	1	1	1	1
St. Joseph	0	0	0	---	0	0	0	3
St. Louis	3	15	6	---	---	0	0	3
North Dakota:								
Fargo	0	0	0	---	0	0	0	0
Grand Forks	0	0	0	---	---	0	0	---
South Dakota:								
Aberdeen	0	0	0	---	---	3	1	---
Nebraska:								
Omaha	1	4	4	---	0	0	2	2
Kansas:								
Topeka	0	0	0	2	2	0	2	0
Wichita	0	1	0	---	0	0	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	0	0	---	0	0	2	1
Maryland:								
Baltimore	4	13	5	1	1	2	0	14
Cumberland	0	0	0	---	0	0	0	0
Frederick	0	0	0	---	0	0	0	0
District of Columbia:								
Washington	0	8	2	---	0	1	0	5
Virginia:								
Lynchburg	0	1	2	---	0	0	0	0
Richmond	0	10	2	---	0	0	0	1
Roanoke	0	3	0	---	0	0	0	0
West Virginia:								
Charleston	0	1	1	---	0	0	0	0
Wheeling	0	0	0	---	0	0	0	0
North Carolina:								
Raleigh	0	2	1	---	0	0	0	1
Wilmington	0	1	1	---	0	0	0	1
Winston-Salem	0	2	2	---	0	0	6	0
South Carolina:								
Charleston	0	0	0	1	0	0	0	1
Columbia	0	1	1	---	0	0	1	1
Greenville	0	1	0	---	0	0	0	0
Georgia:								
Atlanta	0	5	4	---	0	0	1	3
Brunswick	0	0	0	---	0	0	0	0
Savannah	0	1	0	1	0	0	0	3
Florida								
Miami	0	2	0	---	0	2	0	0
Tampa	0	1	2	1	0	0	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0	---	0	0	0	0
Tennessee:								
Memphis	0	2	9	---	0	0	0	5
Nashville	0	2	6	---	0	0	0	5
Alabama:								
Birmingham	0	3	2	1	0	0	0	3
Mobile	0	1	0	---	0	0	0	0
Montgomery	0	2	0	---	---	1	0	---

City reports for week ended September 12, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	1			1	0	
Little Rock	0	0	1		1	0	1	0
Louisiana:								
New Orleans	0	7	0	2	2	0	0	9
Shreveport	0	1	1		0	2	0	0
Oklahoma								
Muskogee	0	0	1		0	1	0	0
Oklahoma City	0	1	1		0	1	0	0
Tulsa	0	0	1			1	1	
Texas:								
Dallas	0	5	4	1	1	0	0	5
Fort Worth	1	1	3		0	0	0	0
Galveston	0	0	0		0	0	0	2
Houston	0	4	3		0	0	1	5
San Antonio	1	2	2		1	0	0	0
MOUNTAIN								
Montana:								
Billings	0	0	0		0	1	0	0
Great Falls	1	0	0		0	0	0	0
Helena	0	0	0		0	2	0	0
Missoula	0	0	0		0	0	0	1
Idaho:								
Boise	0	0	0		0	0	0	0
Colorado:								
Denver	0	8	3		0	0	5	7
Pueblo	0	0	0		0	0	0	0
New Mexico:								
Albuquerque	0	0	0		0	0	0	0
Arizona:								
Phoenix	0	0	0		0	0	0	0
Utah:								
Salt Lake City	5	2	0		0	1	1	0
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	2	2	1			0	1	
Spokane	0	1	0			0	0	
Tacoma	3	1	1		0	0	0	1
Oregon:								
Portland	1	4	0		0	1	2	3
Salem	0	1	0	3	0	1	0	0
California:								
Los Angeles	1	18	7	12	1	6	2	8
Sacramento	1	1	4		0	2	1	3
San Francisco	4	7	2		0	15	2	7

City reports for week ended September 12, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	1	0	0	0	0	0	2	0	0	2	28
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	8
Nashua	0	0	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	1	0	1	0	0	0	0	2
Burlington	0	0	0	1	0	0	0	0	0	4	17
Massachusetts:											
Boston	15	21	0	0	0	8	4	0	0	28	198
Fall River	1	3	0	0	0	0	0	0	0	0	16
Springfield	1	3	0	0	0	1	1	0	0	0	38
Worcester	3	8	0	0	0	2	0	1	0	16	30
Rhode Island:											
Pawtucket	0	0	0	0	0	1	0	1	0	0	13
Providence	2	9	0	0	0	1	0	0	0	1	40
Connecticut:											
Bridgeport	1	0	0	0	0	1	0	0	0	0	19
Hartford	1	0	0	0	0	2	0	1	0	3	45
New Haven	0	0	0	0	0	1	1	0	0	2	53
MIDDLE ATLANTIC											
New York:											
Buffalo	6	8	0	0	0	9	1	0	0	14	139
New York	22	14	0	0	0	82	39	24	1	186	1,239
Rochester	2	9	0	0	0	1	0	1	0	5	57
Syracuse	1	2	0	0	0	0	0	1	0	32	48
New Jersey:											
Camden	0	0	0	0	0	1	0	0	0	6	25
Newark	3	5	0	0	0	10	1	1	0	69	89
Trenton	1	1	0	0	0	3	0	0	1	1	43
Pennsylvania:											
Philadelphia	16	23	0	0	0	23	10	2	0	88	371
Pittsburgh	9	5	0	0	0	3	3	0	0	18	157
Reading	0	0	0	0	0	1	0	0	0	2	26
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	4	12	0	0	0	11	2	2	0	17	123
Cleveland	11	14	0	0	0	18	4	3	1	70	176
Columbus	2	4	0	0	0	4	2	0	0	1	68
Toledo	3	5	0	0	0	5	2	1	0	28	47
Indiana:											
Fort Wayne	0	0	0	0	0	1	1	0	0	0	15
Indianapolis	2	7	0	3	0	7	1	1	0	28	93
South Bend	1	0	0	0	0	2	0	0	0	0	17
Terre Haute	1	0	0	0	0	0	0	0	0	0	11
Illinois:											
Chicago	29	44	0	0	0	47	6	4	0	140	566
Springfield	0	3	0	0	0	0	0	0	0	0	19
Michigan:											
Detroit	23	16	0	0	0	24	4	6	0	107	224
Flint	5	0	0	0	0	1	1	0	0	0	18
Grand Rapids	4	1	0	0	0	1	0	0	0	2	27
Wisconsin:											
Kenosha	0	0	1	0	0	0	0	0	0	1	4
Madison	1	0	0	--------	--------	--------	0	1	--------	0	--------
Milwaukee	7	4	0	0	0	7	0	0	0	58	86
Racine	2	0	0	0	0	0	1	0	0	3	13
Superior	1	0	0	0	0	0	0	0	0	0	11

City reports for week ended September 12, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	5	0	0	0	3	0	0	0	1	29
Minneapolis	12	8	0	0	0	2	1	3	0	10	85
St. Paul	6	0	0	0	0	5	1	2	0	8	52
Iowa:											
Davenport	0	0	0	0	--------	--------	0	0	--------	0	--------
Des Moines	2	0	0	0	--------	--------	0	0	--------	0	24
Sioux City	0	1	0	0	--------	--------	1	0	--------	8	--------
Waterloo	0	0	0	0	--------	--------	0	0	--------	2	--------
Missouri:											
Kansas City	3	2	0	0	0	4	2	0	0	5	76
St. Joseph	1	0	0	0	0	0	0	0	0	0	23
St. Louis	10	3	0	0	0	14	7	2	1	38	201
North Dakota:											
Fargo	0	0	0	0	0	0	1	0	0	6	--------
Grand Forks	0	0	0	0	--------	--------	0	0	--------	0	--------
South Dakota:											
Aberdeen	0	4	0	0	--------	--------	0	0	--------	1	--------
Nebraska:											
Omaha	1	0	1	3	0	2	0	0	0	1	71
Kansas:											
Topeka	1	0	0	0	0	0	0	0	0	0	24
Wichita	1	0	0	0	0	2	1	0	0	0	17
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	1	0	0	0	0	0	1	0	3	25
Maryland:											
Baltimore	5	4	0	0	0	0	8	3	1	93	192
Cumberland	0	0	0	0	0	0	0	1	0	0	14
Frederick	0	1	0	0	0	0	0	0	0	0	2
Dist. of Columbia:											
Washington	5	5	0	0	0	15	3	5	0	32	135
Virginia:											
Lynchburg	0	0	0	0	0	1	1	2	0	1	12
Richmond	3	6	0	0	0	2	2	2	0	1	38
Roanoke	1	1	0	0	0	2	0	1	0	0	9
West Virginia:											
Charleston	1	0	0	0	0	1	2	3	1	1	8
Wheeling	0	0	0	0	0	1	1	1	0	2	18
North Carolina:											
Raleigh	1	1	0	0	0	0	0	0	0	0	12
Wilmington	0	1	0	0	0	0	0	0	0	4	10
Winston-Salem	2	3	0	0	0	0	1	1	0	15	15
South Carolina:											
Charleston	0	1	0	0	0	3	3	1	1	0	39
Columbia	0	0	0	0	0	3	1	1	0	0	29
Greenville	0	0	0	0	0	0	0	0	0	0	--------
Georgia:											
Atlanta	5	4	0	0	0	2	3	18	0	1	63
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	0	0	0	0	4	1	0	0	1	33
Florida:											
Miami	0	0	0	0	0	0	0	0	0	0	24
Tampa	0	0	0	0	0	0	0	0	0	0	25
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	0	0	0	0	1	0	0	1	0	14
Tennessee:											
Memphis	1	3	0	1	0	4	7	0	1	8	79
Nashville	1	0	0	0	0	3	6	2	0	1	61
Alabama:											
Birmingham	4	6	1	0	0	4	3	0	0	0	53
Mobile	0	1	0	0	0	1	0	1	0	0	14
Montgomery	1	1	0	0	--------	--------	1	3	--------	0	--------

City reports for week ended September 12, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	--------	--------	0	0	--------	0	--------
Little Rock	1	1	0	0	0	1	1	1	0	0	4
Louisiana:											
New Orleans	2	5	0	0	0	9	4	14	2	4	147
Shreveport	1	1	0	0	0	2	0	3	0	7	28
Oklahoma:											
Muskogee	0	0	0	0	0	0	0	0	0	0	--------
Oklahoma City	2	1	0	0	0	1	3	3	0	0	28
Tulsa	2	2	0	0	--------	--------	1	1	--------	0	1
Texas:											
Dallas	2	5	0	0	0	4	2	5	1	4	61
Fort Worth	1	6	1	0	0	1	1	2	0	0	34
Galveston	0	0	0	0	0	0	0	0	0	0	7
Houston	1	0	0	0	0	1	1	4	2	0	54
San Antonio	1	0	0	0	0	3	0	0	0	0	59
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	2
Great Falls	0	0	0	0	0	0	0	0	0	3	8
Helena	0	0	0	0	0	0	0	1	0	0	8
Missoula	0	0	0	0	0	0	1	1	0	0	11
Idaho:											
Boise	0	0	0	0	0	0	0	1	0	0	9
Colorado:											
Denver	3	6	0	0	0	6	1	0	0	8	79
Pueblo	0	0	0	0	0	0	0	1	0	0	6
New Mexico:											
Albuquerque	0	1	0	0	0	1	1	0	0	3	7
Arizona:											
Phoenix	1	0	0	0	0	3	0	0	0	0	--------
Utah:											
Salt Lake City	0	1	1	0	0	3	1	0	0	0	28
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	1
PACIFIC											
Washington:											
Seattle	4	6	0	0	--------	--------	1	4	--------	9	--------
Spokane	2	0	1	0	--------	--------	0	3	--------	3	--------
Tacoma	0	1	1	0	0	0	1	0	0	1	26
Oregon:											
Portland	3	1	3	3	0	3	0	1	0	2	64
Salem	0	0	1	0	0	0	0	0	0	2	--------
California:											
Los Angeles	8	11	1	0	0	24	2	3	0	9	294
Sacramento	0	0	0	0	0	0	0	1	0	1	28
San Francisco	5	2	1	0	0	5	1	3	0	2	161

City reports for week ended September 12, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	1	1	0
New Hampshire:									
Nashua	0	0	0	0	0	0	0	2	0
Massachusetts:									
Boston	0	0	0	0	0	0	4	53	2
Fall River	0	0	0	0	0	0	1	1	0
Springfield	0	0	0	0	0	0	1	7	0
Worcester	1	0	0	0	0	0	0	9	0
Rhode Island:									
Pawtucket	0	0	0	0	0	0	0	2	1
Providence	0	0	0	0	0	0	0	8	2
Connecticut:									
Bridgeport	0	0	0	0	0	0	1	7	0
Hartford	0	0	1	1	0	0	1	16	3
New Haven	0	0	0	0	0	0	0	13	3
MIDDLE ATLANTIC									
New York:									
New York	7	2	1	1	0	0	13	254	34
Rochester	0	0	0	0	0	0	0	2	0
Syracuse	0	0	0	0	0	0	3	2	1
New Jersey:									
Camden	0	0	0	0	0	0	0	1	0
Newark	0	0	0	0	0	0	1	9	1
Trenton	0	0	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	0	0	0	0	0	0	1	4	0
Pittsburgh	0	1	2	2	0	0	1	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	1	0	0	0	0	1	1	0
Cleveland	0	0	0	0	0	1	2	4	1
Toledo	0	0	1	0	0	0	1	0	0
Indiana:									
Fort Wayne	0	0	0	0	0	0	0	2	1
Indianapolis	0	1	0	0	0	0	0	0	0
Illinois:									
Chicago	2	1	1	0	0	0	4	9	1
Springfield [1]	1	1	0	0	0	0	0	0	0
Michigan:									
Detroit	3	0	1	1	0	0	2	31	2
Flint	0	0	0	0	0	0	0	2	0
Grand Rapids	0	0	0	0	0	0	1	5	1
Wisconsin:									
Madison	0	0	0	0	0	0	0	11	0
Milwaukee	0	0	0	0	0	0	1	4	0
Racine	0	0	0	0	0	0	0	2	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	6	0
Minneapolis	1	1	0	0	0	0	0	5	2
St. Paul	0	0	0	0	0	0	0	24	4
Iowa:									
Des Moines	0	0	0	0	0	0	1	1	0
Missouri:									
St. Louis	4	1	0	0	0	0	0	0	0
North Dakota:									
Fargo	0	0	0	0	0	0	0	1	0
Nebraska:									
Omaha	0	0	0	0	0	0	0	1	0
Kansas:									
Topeka	0	0	0	0	0	0	0	1	0

[1] Typhus fever, 7 cases: 4 cases at Springfield, Ill., and 3 cases at Savannah, Ga.

City reports for week ended September 12, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	0	0	0	1	1	0
District of Columbia:									
Washington	2	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	2	2	0	0	0
Winston-Salem	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	0	1	0	0	0
Columbia	0	0	0	0	0	2	0	0	0
Georgia:									
Savannah [1] [2]	0	0	0	0	0	0	0	1	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	0	0	0	1	0	0	2	0
Nashville	1	0	0	0	1	0	0	0	0
Alabama:									
Mobile	1	1	0	0	0	1	0	0	0
Montgomery	0	0	0	0	0	0	0	1	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	1	0	0	0	1	1	0	0	0
Shreveport	0	0	0	0	0	2	0	0	0
Oklahoma:									
Oklahoma City	0	0	0	1	1	0	0	0	0
Texas:									
Dallas	0	0	0	0	2	1	0	0	0
Houston	1	0	0	0	0	0	0	0	0
San Antonio	0	0	0	0	0	0	0	1	1
MOUNTAIN									
Montana:									
Missoula	0	0	0	0	0	0	0	3	1
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	1	0	0
Spokane	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	0	0	0	0	0	0	2	4	0
San Francisco	0	0	0	0	0	1	1	0	0

[1] Typhus fever, 7 cases: 4 cases: at Springfield, Ill., and 3 cases at Savannah, Ga.
[2] Dengue: 2 cases at Savannah, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended September 12, 1931, compared with those for a like period ended September 13, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, August 9 to September 12, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Aug. 15, 1931	Aug. 16, 1930	Aug. 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930
98 cities	[2] 32	31	[2] 30	33	[2] 31	38	[3] 37	40	35	44
New England	41	44	67	44	41	53	55	39	58	60
Middle Atlantic	26	22	19	27	18	29	24	29	26	26
East North Central	[2] 30	36	[2] 28	40	[2] 33	45	38	48	32	63
West North Central	36	27	31	25	36	27	[4] 26	35	34	56
South Atlantic	43	38	24	40	63	64	34	66	45	68
East South Central	17	30	35	12	52	12	81	48	99	24
West South Central	47	49	68	63	34	66	[5] 107	56	41	45
Mountain	78	18	44	44	17	70	52	44	26	35
Pacific	31	30	35	22	24	16	27	32	29	22

MEASLES CASE RATES

98 cities	[2] 39	32	[2] 29	28	[2] 22	20	[3] 19	24	14	16
New England	79	65	63	65	63	22	58	36	29	41
Middle Atlantic	32	39	25	31	13	22	14	27	8	19
East North Central	[2] 61	19	[2] 37	21	[2] 23	7	11	12	13	9
West North Central	11	31	13	19	8	27	[4] 9	31	11	15
South Atlantic	10	24	20	20	4	32	8	28	6	6
East South Central	23	18	23	6	6	12	6	24	6	6
West South Central	0	7	7	0	24	10	[5] 0	0	10	3
Mountain	61	44	70	26	52	35	52	53	35	35
Pacific	49	43	22	40	53	30	67	34	45	16

SCARLET FEVER CASE RATES

98 cities	[2] 33	30	[2] 43	32	[2] 41	41	[3] 48	42	49	50
New England	53	56	99	51	46	56	87	60	106	56
Middle Atlantic	31	17	38	25	30	26	37	24	30	26
East North Central	[2] 48	39	[2] 57	35	[2] 43	47	56	47	64	84
West North Central	23	29	19	35	31	43	[4] 30	58	36	35
South Atlantic	22	28	36	30	30	72	51	72	55	56
East South Central	41	48	17	30	70	102	87	60	64	36
West South Central	17	31	27	35	64	14	[5] 55	63	41	24
Mountain	26	44	44	88	165	88	26	35	61	79
Pacific	10	32	31	28	39	26	43	28	39	63

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Terre Haute, Ind., not included.
[3] St. Paul, Minn., and Fort Smith, Ark., not included.
[4] St. Paul, Minn., not included.
[5] Fort Smith, Ark., not included.

Summary of weekly reports from cities, August 9 to September 12, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Aug. 15, 1931	Aug. 16, 1930	Aug. 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930
98 cities	[2] 1	3	[2] 1	2	[2] 1	2	[3] 1	3	1	3
New England	0	0	0	0	0	0	0	0	2	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	[2] 1	3	[2] 0	0	[2] 0	0	4	2	2	2
West North Central	8	6	6	8	4	8	[4] 4	14	6	27
South Atlantic	2	0	4	2	4	0	0	4	0	0
East South Central	0	6	0	0	0	0	0	0	6	0
West South Central	0	3	0	7	0	3	[5] 0	0	0	0
Mountain	9	0	0	0	0	0	0	0	0	0
Pacific	2	12	4	10	4	10	2	12	0	8

TYPHOID FEVER CASE RATES

98 cities	[2] 21	20	[2] 21	19	[2] 22	24	[3] 20	21	23	26
New England	26	5	5	17	22	12	7	12	7	22
Middle Atlantic	14	14	14	13	20	20	13	20	13	24
East North Central	[2] 7	10	[2] 11	9	[2] 10	10	16	12	10	17
West North Central	13	29	19	21	13	19	[4] 6	14	13	21
South Atlantic	77	44	55	60	38	88	49	58	79	70
East South Central	70	132	70	78	47	42	41	48	35	48
West South Central	45	42	91	24	98	66	[5] 76	45	91	52
Mountain	44	26	9	26	9	44	44	9	35	62
Pacific	12	12	8	6	12	8	10	8	27	4

INFLUENZA DEATH RATES

91 cities	[2] 3	1	[2] 2	3	[2] 2	4	[4] 2	3	4	3
New England	0	0	2	0	0	0	2	0	2	0
Middle Atlantic	3	2	2	3	2	3	1	3	4	4
East North Central	[2] 2	0	[2] 2	1	[2] 1	4	1	2	3	3
West North Central	3	3	3	0	3	3	[4] 3	6	9	0
South Atlantic	4	0	6	8	6	8	2	8	2	2
East South Central	6	0	0	0	13	6	6	0	0	19
West South Central	7	0	0	4	0	7	10	11	17	0
Mountain	17	0	0	9	0	0	0	9	0	0
Pacific	2	0	7	7	2	2	2	0	2	0

PNEUMONIA DEATH RATES

91 cities	[2] 45	53	[2] 48	45	[2] 48	52	[4] 50	53	55	54
New England	29	41	36	56	46	51	24	56	58	68
Middle Atlantic	56	68	56	53	60	57	62	65	65	63
East North Central	[2] 37	27	[2] 32	27	[2] 26	50	33	36	36	43
West North Central	44	27	44	36	50	39	[4] 73	51	44	45
South Atlantic	57	74	63	52	69	60	61	68	63	58
East South Central	50	52	57	65	57	45	38	91	82	26
West South Central	52	85	59	57	59	36	83	50	73	57
Mountain	44	123	44	53	61	53	96	53	70	123
Pacific	14	40	53	40	29	45	19	27	46	25

[2] Terre Haute, Ind., not included.
[3] St. Paul, Minn., and Fort Smith, Ark., not included.
[4] St. Paul, Minn., not included.
[5] Fort Smith, Ark., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended September 5, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended September 5, 1931, as follows:

Province	Cerebro-spinal fever	Dysentery	Poliomyelitis	Small-pox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia					1
New Brunswick					3
Quebec			69		30
Ontario	2		13		20
Manitoba			1		4
Saskatchewan		5	1	3	1
Alberta					1
British Columbia			2	1	2
Total	2	5	86	4	62

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended September 5, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended September 5, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	4	Poliomyelitis	82
Diphtheria	33	Scarlet fever	24
Erysipelas	4	Tuberculosis	40
Measles	4	Typhoid fever	25
Mumps	1	Whooping cough	20

Ontario—Communicable diseases—Comparative—Five weeks ended August 29, 1931.—The Department of Health of the Province of Ontario, Canada, reports certain communicable diseases for the five weeks ended August 29, 1931, as follows:

Disease	1930		1931	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	27	4	9	1
Chancroid	1			
Chicken pox	218		173	
Conjunctivitis	1			
Diphtheria	225	13	153	5
Dysentery	1			1
Erysipelas		1	2	
German measles	14		20	
Gonorrhea	204		224	
Influenza	9	2		
Lethargic encephalitis		1	3	1
Measles	201		675	
Mumps	28		103	
Paratyphoid fever	2		165	2
Pneumonia		74		65
Poliomyelitis	175	16	35	3
Puerperal septicemia	2	2		
Scarlet fever	182	3	150	
Septic sore throat	3		1	
Smallpox	22		10	
Syphilis	187	1	117	
Tetanus	1	1	1	1
Trachoma			1	
Trench mouth			1	
Tuberculosis	98	91	161	63
Tularaemia			2	
Typhoid fever	71		131	5
Undulant fever	10		28	
Whooping cough	367	3	514	7

DENMARK

Communicable diseases—June, 1931.—During the month of June, 1931, cases of certain communicable diseases were reported in Denmark, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	5	Paratyphoid fever	9
Chicken pox	27	Poliomyelitis	1
Diphtheria and croup	188	Puerperal fever	8
Erysipelas	216	Scabies	510
German measles	6	Scarlet fever	181
Gonorrhea	806	Syphilis	106
Influenza	2,930	Tetanus	3
Lethargic encephalitis	5	Undulant fever (bac. abort. Bang)	67
Measles	2,771	Whooping cough	1,443
Mumps	278		

GREAT BRITAIN

England and Wales—Vital statistics—April–June, 1931.—During the second quarter of the year 1931, 163,874 births and 114,700 deaths were registered in England and Wales, giving a birth rate on an annual basis of 16.5 per 1,000 population and a death rate of 11.5 per 1,000. The figures are provisional. The mortality of infants under 1 year of age was 58 per 1,000 live births.

During the 13 weeks ended July 4, 1931, deaths from certain communicable diseases were reported in 107 county boroughs and great towns, including Greater London, as follows:

Disease	Number of deaths	Death rate per 1,000 population	Disease	Number of deaths	Death rate per 1,000 population
Diarrhea and enteritis (under 2 years)	532	6.4	Scarlet fever	65	0.01
Diphtheria	297	.06	Smallpox	4	
Influenza	753	.15	Typhoid fever	20	
Measles	482	.10	Whooping cough	315	.06

Deaths from certain communicable diseases in 159 smaller towns for the quarter ended June 30, 1931, were as follows:

Disease	Deaths	Disease	Deaths
Diarrhea and enteritis (under 2 years)	72	Scarlet fever	19
Diphtheria	54	Smallpox	1
Influenza	267	Typhoid fever	6
Measles	141	Whooping cough	69

England and Wales—Communicable diseases—Thirteen weeks ended July 4, 1931.—During the 13 weeks ended July 4, 1931, cases of communicable diseases were reported in England and Wales as follows (civilians only):

Disease	Cases	Disease	Cases
Diphtheria	11,107	Puerperal pyrexia	1,385
Ophthalmia neonatorum	1,431	Scarlet fever	18,727
Pneumonia	11,369	Smallpox	1,649
Puerperal fever	638	Typhoid fever	464

JAMAICA

Communicable diseases—Four weeks ended August 15, 1931.—During the four weeks ended August 15, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica, outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Puerperal fever		2
Chicken pox	1	4	Scarlet fever		8
Dysentery		2	Tuberculosis	34	91
Leprosy		2	Typhoid fever	17	99

PORTO RICO

San Juan—Communicable diseases—Four weeks ended August 15, 1931.—During the four weeks ended August 15, 1931, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	5	Typhoid fever	1
Malaria	64	Whooping cough	7
Tetanus	2		

SAMOA

Influenza epidemic.—Information received from the Navy Department under date of September 29, 1931, reports the occurrence of an epidemic of influenza at Samoa, with 1016 cases reported on September 28. There had been reported 2020 cases to date, and it was said that the epidemic was spreading rapidly throughout the islands. It was estimated that there were 1,000 more cases in outlying districts. The type of disease was considered mild. There had been one death in a native.

VIRGIN ISLANDS

Communicable diseases—August, 1931.—During the month of August, 1931, cases of certain communicable diseases were reported in the Virgin Islands as follows:

	Cases		Cases
St. Thomas and St. John:		St. Croix:	
Sprue	1	Gonorrhea	1
Syphilis	10	Syphilis	5
		Tuberculosis	1

YUGOSLAVIA

Communicable diseases—August, 1931.—During the month of August, 1931, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	195	21	Poliomyelitis	1	
Cerebrospinal meningitis	7	3	Scarlet fever	426	41
Diphtheria	669	84	Sepsis	3	2
Dysentery	581	66	Tetanus	56	31
Erysipelas	173	15	Typhoid fever	495	48
Measles	96	5	Typhus fever	3	
Paratyphoid fever	40	1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Mar. 8-Apr. 4, 1931	Apr. 5-May 2, 1931	May 3-30, 1931	May 31-June 27, 1931	Week ended— July, 1931 4	11	18	25	August, 1931 1	8	15	22	29	September, 1931 5	12	19
Ceylon: Colombo	C	1		1	1					1	1	1					
	D			1	1					1	1	1					
China:																	
Canton	C		1	2	1									1	1		
	D			1													
Shanghai	C						1				1	5	1	1	3		
Swatow	C				10	7											
Tientsin	C			1	10												
	D			1	1												
India	C	8,968	11,462	13,604	18,001	4,737	5,002	5,707	6,628								
	D	4,550	5,767	7,270	10,337	2,677	2,848	3,064	3,504								
Bombay	C		2				1	11	11	9	18	6	11	27	5		
	D		1					6	10	4	9	7	5	9	5		
Calcutta	C	436	310	265	292	72	62	55	48	42	27	20	21	10	3		
	D	256	176	149	168	35	34	58	28	10	7	7	6	4	2		
Karikal	C	12	19	12								1					
	D	12	14	7								1					
Madras	C	20	26	52	9	2	2			1		2	3	3	1		
	D	10	13	17	4												
Moulmein	C							1									
	D							1									
Negapatam	D													1			
Rangoon	C			2	4		1	2	1		1	1					
	D			1	2			1			1	1					
Vizagapatam	C				1												
India (French):																	
Chandernagor	C	7	6	4	3	1	1	1	2	1	4	2					
	D	6	5	4	3		1			1	4	2					
Pondicherry	C	100	24	17	3		1	1	1	1	1	1					
	D	18	4	7	3		1	1	1	1		1					
India (Portuguese)	C				1		2				1						
	D						1				1						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19
Indo-China (see also table below):																	
Cochin-China—Rachgia	C									P							
Pnompenh	C		2		1		1	4			1		1				
	D	1	1	2	1		1	1			1						
Saigon and Cholon	C	5	27	104	61	8	3	3									
	D	5	22	76	41	3	2	2									
Iraq:																	
Abulkhasib	C													6			
	D													5			
Amara	C												2	22	35	8	1
	D												1	21	30	7	1
Amara Province	C													6	11	106	73
	D													5	4	67	44
Basra	C									3	9	263	272	148		54	91
	D									2	8	140	137	76		30	48
Basra Province	C												5	11	6	10	23
	D												2	10	3	7	10
Muntafiq Province	C													10	21	66	123
	D													8	20	42	75
Nasiriyah	C														22	50	16
	D														15	40	20
Suqelshuyukh	C													2			
	D													2			
Persia: Rafsanjan [1]	C			36													
	D			14													
Philippine Islands: [2] Provinces—																	
Capiz	C	43	29	17	4										9	9	17
	D	41	24	15	4										5	6	5
Cebu	C										1	1	1				
	D										1	1	1				
Iloilo	C	7			26	24	3										
	D	4			21	22	3										
Masbate	C	21															
	D	9															

Negros, Occidental	C				2												
	D				1												
Pampanga	C			1													
Siam	C	10	16	14	4	1	1		1								
	D	2	4	5	2		1										
Ayudhaya District	C	1															
Bangkok	C	3	3	3	1	1			3			1					
	D	2	2	1	1				2								
Bismulok Province	C	8															
	D	2															
On vessel:																	
S. S. Arankola at Rangoon from Calcutta	C			1													
S. S. City of Eastborne, at Calcutta from Cocanada	C				1												
S. S. Tairea, at Penang from Calcutta	C				1												
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C								1								
	D								1								
S. S. Kohistan, at Basra from Bushire, Persia	C								2								
S. S. Cathay at Kobe, Japan, from Shanghai	C												4				
	D												1				

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			Aug. 1–10, 1931
					1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	
Indo-China (French) (see also table above):														
Cambodia [1]	C	125	79	58		44	40	83	96		72	82	87	12
Cochin-China [1]	C	29	105	62		52	75	71	69		66	30	47	39

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19
Algeria:																	
Algiers	C	1								2							
	D	1															
Bone	C				1												
Philippeville	C							1				1	1				
	D							1				1					
Argentina: San Juan Province	C							P	P								
Belgian Congo	C	2			1												
	D	2			1												
British East Africa (see also table below):																	
Tanganyika	C	8	18	46	17			6				8					
	D	1	21	30	10			6				2					
Uganda	C	19	35	138	298	95	132	68	93								
	D	19	32	126	286	94	129	96	90								
Ceylon: Colombo	C	8	4	3	2				1	4	1	1			1		
	D	7	3	3	2				1	4	1	1			1		
Plague-infected rats		4	1	5						1	3	4					
China:																	
Amoy [1]	C			1													
	D			1													
Changchuanpu	C																18
Dutch East Indies:																	
Batavia and West Java	C	84	74	59	116	21	18	19	17	12							
	D	80	71	59	66	21	18	19	17	12							
East Java and Madura	C	4	1	1													
	D	4	1	1													
Java and Madura	D	277	243	176	192	59	55	52	66	38	53	67					
Egypt:																	
Alexandria	C	1			4	1	1	2	9	4	3	1	1		2		1
	D				4	1			4	1	2				1		
Assiout	C	13	32	18	11												
	D	6	17	7	1												
Beni-Suef	C		12	5													
	D		3	3													
Beheira	C									1		1			2		

Cairo	C	1															
Dakahlia	C							1			2						
Deirout	C		3	10	3												
	D		1	4	1												
Gharbieh	C				1												
	D				1												
Girga	C	86	44	7		1											
	D	24	22	2													
Kena	C	5	3	1													
	D	2	1	1													
Manfalut	C	17															
	D	3															
Minieh	C	3	1	6	3	10		2									
	D	2		3	1	2		1	1								
Port Said	C				3	1	1	2	1	2							
	D			1	2	1											
Tanta	C											2			1		1
Hawaii Territory:																	
Hawaii—Hamakua—Plague-infected rats				1								1					
Maui Island—																	
Haliimaile—Plague-infected rats																	1
Kula District	C										1						
	D										1						
India	C	9,139	6,142	752	88	30	29	78	84								
	D	7,037	5,199	692	51	15	13	42	58								
Bassein	C		1	1		1			3		1		1		1		
	D		1	1		1			2		1		1		1		
Bombay	C	4	11	8		1	1	11									
	D	3	11	6				6									
Plague-infected rats		70	137	94	37	11	16	9	12	8	13	17	9	23	17		
Burma	C							7	9								
	D							5	5								
Calcutta	C		2														
	D		2														
Madras Presidency	C	23	3	2	6	1	2	8	10					9	6		
	D	21	2	1	1		1	1	7					4	5		
Moulmein	C							1						P	5		
	D							1							4		
Rangoon	C	1	1	2	1			2		1							
	D	1	1	2	1			1		1							
Plague-infected rats		7	4	7	3	1	2	2	1	1		1	1	1			
Indo-China (see also table below): Pnompenh	C				2												
	D	6	4		2												
Iraq:																	
Baghdad	C	8	23	23	23	1	1	1				1			1	1	
	D	5	8	9	9	1		1									
Maudhan	C			2													
Madagascar (see also table below): Tamatave	C									1						2	
Nigeria: Lagos	C		5														
	D		5														
Plague-infected rats			6														

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19
Peru (see table below).																	
Senegal (see table below).																	
Siam	C	31	1	2	1												
	D	7	1	2	1												
Bangkok	C	29															
	D	6															
Nagara Rajsima	C	1															
Spain: Hospitalet—Barcelona Province	C												5	1			
	D												2				
Syria: Beirut	C						1		1			1				1	
Tripolitania	C	1															
Tunisia: Tunis	C	10	16	16	11												
	D	4	8	3	1												
Union of South Africa:																	
Cape Province	C		3														
Orange Free State	C	6	2	2													
	D	1	2	2													

Place		Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931	Aug., 1931
British East Africa (see also table above):							
Kenya	C	7	345	215	154	484	
Indo-China (see also table above)	C	4	11		2	1	
	D		2		2	1	
Madagascar (see also table above):							
Ambositra Province	C	70	30	19	15	1	
	D	86	29	18	15	1	
Antsirabe Province	C	83	48	7	12		
	D	74	47	7	12		
Miarinarivo Province	C	19	6	2		8	
	D	19	6	2		7	
Moramanga Province	C	1		2	1	1	
	D	1		2			
Tananarive Province	C	90	41	18	10	5	
	D	81	40	18	9	5	

Place		Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931	Aug., 1931
Peru	C	8	8	2	5	2	
	D	2	1		1		
Senegal:							
Baol [1]	C			4		27	101
	D			3		13	58
Dakar [1]	C		2	63	64	95	194
	D		1	49	56	73	105
Louga [1]	C	14	1	5	4	3	2
	D	6		2	2	1	1
Rufisque [1]	C			1	2	34	2
Thies [1]	C				12	16	26
	D				3	7	16
Tivaouane [1]	C		4	19	3	3	
	D			11	2	2	

[1] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931 6	June 13	June 20	June 27	July, 1931 4	July 11	July 18	July 25	August, 1931 1	Aug. 8	Aug. 15	Aug. 22	Aug. 29	September, 1931 5	Sept. 12
Algeria:																			
Algiers	C	2	2	1		7	1				1								
Constantine	C	1		1					1									1	
Belgian Congo	C			47	27	15													
Bolivia.[1]																			
Brazil: Porto Alegre (alastrim)	C	49	53	19	2	3			9	10	9	13	11						
	D	1			1					1			1						
British East Africa: Tanganyika	C	8		13			1	6	37	83		29	1						
	D	3							7	5		5							
British South Africa:																			
Northern Rhodesia	C									21									
Southern Rhodesia	C					1				2									
Canada:																			
Alberta	C										1				1				
British Columbia	C											2	2			3		1	1
Manitoba	C				4														
Winnipeg	C																		1
Nova Scotia	C		1																
Ontario	C		9	17	25		4	3	14	3	6	12	1		2	2	4		
Kingston	C	1	5															1	
Ottawa	C						1												1
Sault Ste. Marie	C		4	1															
Toronto	C	2	4	1			1												
Quebec	C								1										
Saskatchewan	C	58	46	48	7	16	18	13		13	10	19		10	6	10	8	8	3
Regina	C	2	2	2															
Canary Islands: Las Palmas	C	1																	
Chile:																			
Antofogasta	C								1										
Chanaral	C			1															

[1] An epidemic of smallpox was reported on May 18 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931 6	June 13	June 20	June 27	July, 1931 4	July 11	July 18	July 25	August, 1931 1	Aug. 8	Aug. 15	Aug. 22	Aug. 29	September, 1931 5	Sept. 12
China:																			
Amoy	C	1	2	6	1	2		1	1	1			1						
	D	1	1	3	1	1		1	1	1			1						
Canton	C	7	4	3			1		1			1					1		
Foochow	C	P	P	P		P						P		P					
Hankow	C	3	3	5	1	1	1	1	1										
Hong Kong	C	2	3	1															
	D	2	1	2															
Manchuria—																			
Harbin (see also table below)	C	2		3															
Kwantung—Dairen	C	2	2	2	1														
Nanking	C	P	P	P															
Shanghai—																			
Foreigners only	C	6	17	7	2	6	2	1	2	1									
Including natives	D	10	18	7	1	5	4	3	2	1	2	1				1	1		
Swatow	D	26	2																
Tientsin	C			2						2	1								
Chosen (see table below).																			
Colombia: Cali	D			1															
Dutch East Indies:																			
Batavia and West Java	C	1		2															
East Java and Madura	C			1															
Finland	C		1																
France (see table below).																			
Great Britain:																			
England and Wales	C	795	744	570	83	94	62	48	56	45	50	36	26	25	19	21	33		
Bradford	C	2	6	8			5												
Leeds	C	1	2	2															
London	C	147	227	183	25	50	31	16	21	9	12	12	6	12	4	4	3		
London and Great Towns	C	544	558	403	57	54	49	38	53	33	34	32	22	20	17	10	13		
	D		2		1				1										
Sheffield	C	10	7																
Greece (see table below).																			

Honduras:																			
Tegucigalpa	C		1																
Tela	C		1																
India	C	11,791	14,265	11,403	2,170	1,856	1,622	1,665	1,492	1,376	1,236	1,255							
	D	2,251	2,923	1,849	465	474	376	389	404	363	292	293							
Bassein	C			1															
Bombay	C	10	8	9		2	1	3		1	3	2	1		1			1	
	D	4	5	4		1	1	3		1	3	2	1					1	
Calcutta	C	382	287	89	14	19	14		11	6	2	2	4	4		5	2	1	
	D	203	224	75	12	18	11		9	4	3	2		4		5	2	1	
Cochin	C	46	30	3										1	1	1			
Karachi	C	4	6				2						1						
	D	2					1												
Madras	C	22	19	8			1	1		2			1					1	
	D	3	5	6				1											
Negapatam	C		3				2	1			1			2			3		
Rangoon	C	3	11	13		1	4	1	2		1		2		1	1	1		
	D	1	1	5		1		1	1				1			1			
Vizagapatam	C	2	10	6	2	1		3	2		2	1		3		2	3		
	D	1	2	1		1		1	1					3		1	3		
India (French):																			
Chandernagor	C	14	10	7			1		2		1								
	D	2	7	5					2										
Karikal	C	3	4	4	1	2		3	1	1	1	1	1	1	3				
	D		3	4	1	2		3	1	1	1	1	1	1	2				
Pondicherry Province	C	14	6	11	3	2	1	1	4	1		23	11			3	1	6	
	D	14	9	11	3	2	1	1	4	1		23	11			3	1	6	
India (Portuguese)	C	8	21	3															
	D	3	6	1															
Indo-China (see also table below):																			
Pnompenh	C	1		1	2														
	D			1															
Saigon and Cholon	C	8	1	2					1			2	1	1			1		
	D	8	1	1					1				1				1		
Iraq:																			
Baghdad	C		2	3		1													
	D			2															1
Basra	C			2		1													
Mosul Liwa	C										1					1			
Ivory Coast (see table below).																			
Japan: Nagoya	C										1								
Mexico (see also table below):																			
Jalisco (State)—Guadalajara	D	1	1	2		1			1	1		1			2				
Mexico City and surrounding territory	C	33	43	45	5	4	16		12	5	4	1	8	2			2		
	D	22	14	11	4	3	6		4	3	1		1	1					
Monterrey	C				1														
Torreon	C		1	1			1	2										1	
	D		2				1	1											
Vera Cruz	C	2	2	1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931 6	June 13	June 20	June 27	July, 1931 4	July 11	July 18	July 25	August, 1931 1	Aug. 8	Aug. 15	Aug. 22	Aug. 29	September, 1931 5	Sept. 12
Morocco (see table below).																			
Nigeria: Lagos	C	2																	
Poland	C			3	1	1		1		17		1							
Portugal: Lisbon	C	52	56	67	5	17	12	14	15	12	18		17	12	8		10	21	
Rumania (see table below).																			
Siam	C		1	6			4	1		1									
	D			1				1			1								
Spain	C	P									7								
Straits Settlements	C	4	10	2										1					
	D	1	5	2															
Sudan (Anglo-Egyptian)	C	8	3	6		1												32	
	D	2		2														6	
Sudan (French) (see table below).																			
Syria (see table below).																			
Tunisia: Tunis	C	4																	
Turkey (see table below).																			
Union of Socialist Soviet Republics (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P															
Orange Free State	C	P	P	P	P	P	P	P	P	P	P								
Transvaal	C	P					P		P	P	P								
Upper Volta	C	3	3	58	11		1		1		1								
	D	1		1															
On vessel:																			
S. S. Rotterdam at Naples from Venice	C	1																	
S. S. Clan McTavish at Manila from Chittagong	C		1																
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C		1													1			
S. S. Talodi at Suakin	C			1															

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
China: Harbin (see also table above)	C			7		13	10	
Chosen	C	1		11		1	4	
	D	1		3				
France	C	4	16	15	6	54		
Greece	C		4			3	1	
Mexico (see also table above)	D		3		1	1	2	
Morocco	C		4	6	7	49	48	23

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Rumania	C			1		1		
Turkey	C	63	37	1		9	1	
	D	7	6					
Union of Socialist Soviet Republics.								
Territories in Asia	C	194	532					
Ukraine	C	44	23					
Other territories in Europe	C	896	1,577					
Railroads, etc	C	43	77					

Place		January, 1931	February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			August, 1931		
						1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31
Indo-China (see also table above)	C	141	163	264	142		17	41	30	16	1	1		7	29		
Ivory Coast	C																7
Sudan (French)	C			4													
Syria: Beirut	C	1								1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	Week ended— June, 1931: 6	13	20	27	July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	Sept. 5, 1931
Algeria:																		
Algiers	C	3	3	7	4	4		1			2							
Bone	C														1	1		
Constantine Department	C	3	9	22	6	3	1	16	2		1		3					
Oran	C		1	2	2									1				1
Australia, Western	C	1	1	1														
Bulgaria	C	9	30	16	11	10	6	3										
	D	2	3	4	2	1	1	2										
China:																		
Canton	C	1																
Manchuria—Harbin	C	3	8					16										
Shanghai	C										1							
Tientsin	C		2															
Chosen (see table below).																		
Czechoslovakia (see table below)																		
Egypt:																		
Alexandria	C		1		1	1		1										
Beheira Province	C		4															
	D		2														1	
Cairo	C																	
Eritrea: Asmara	C	1																
Great Britain: Scotland—Fife County	C			1														
Greece (see table below).																		
Guatemala [1] (see table below).																		
Iraq: Baghdad	C	2		2														
	D			2														
Irish Free State:																		
Cork County—																		
Schull	C									1								
Skibbereen	C					1		1	1									
Kerry County—																		
Dingle	C			1														
Listowel	C							1										

Limerick County—																		
Limerick	C								2				1					
Michelstown	C								1									
Mayo County—																		
Belmullet	C			1														
Westport	C															1		
Japan	C							1										
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D											1						
Mexico City, including municipalities in Federal District	C	216	170	75	7	12	27		28	9	7	9	7	6		5		
	D	84	56	33	4	4	11		4	3	2	3	5	3		2		
San Luis Potosi	C	5	3	2						1	3					1		
Torreon	C											1						
	D											1						
Morocco	C	7	13	42		31	42	28	37	20	24	21		2	1	5		
	D		1	4		2	3	1	4	4								
Palestine	C	5	5	4		2	3		2				3	3	1	4		
Panama Canal Zone—Balboa	C			2														
Paraguay: Asuncion	D	1																
Poland	C	287	538	298		48	33	16	9	17	13	14	10	4	10	7	6	
	D	15	28	18		2	1	1	2	1	1	1	1		1			
Rumania	C	214	70	169	42	16	12	10	2	2	7							
	D	16	8	18	4	7	2		2	2	1							
Syria	C			4														
Tunisia:																		
Sbeitla, vicinity of	C	20	12															
	D	7																
Sfax	C	2																
Tunis	C	14	13	29		64	9		1			1						
	D			3		4												
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below.)																		
Union of South Africa:																		
Cape Province	C	1	P	P	P	P	P		P	P	P	P						
Municipality of East London	C	P					1						1					
Natal	C	1	P	P	P	P	P	P			P	P						
Orange Free State	C	P	P	P	P	P	P		P	P	12	P						
Transvaal	C	P	P	P	P	P	P		P	P	P	P						
Yugoslavia (see table below).																		

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reported an unusua loutbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Chosen: Seoul	C	124	3	4		6	
	D	8		1		1	
Czechoslovakia	C	26		5	11	2	
Greece	C	17	8	22	6	9	1
	D	2	1	3			
Guatemala	C					33	34
	D					15	5
Latvia	C	12					
Lithuania	C	3	99	34	10	13	
	D	1	3	5		2	

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Mexico (see also table above)	D	83					
Turkey	C	18	15		3	3	2
Union of Socialist Soviet Republics:							
Territories in Asia	C	260					
Ukraine	C	419					
Other territories in Europe	C	1,373					
Railroads, etc	C	158					
Yugoslavia	C	12	10	43	14	2	3
	D		1	5			

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19
Brazil:																	
Alagoas State	C											1					
	D											1					
Bahia State	C	1															
Ceara State	C	2	2	1	1								1				
	D		2	1									1				
Minas Geraes State	C	2	5	2													
	D	1	2	1													
Rio de Janeiro State	C	2		2													
	D	2															
Cambucy	C	1															
Sergipe State	C				1												
British Cameroons: Mamfe	C			3	2												
	D			2													

Colombia—Magdalena Province—Near Cienaga	C							4									
Gold Coast:																	
Akuse	C					2											
	D					1											
Dagomba District	C									2							
Kintampo	C							1									
	D							1									
Oda	C																1
	D																1
Tamale	C						2										
	D						2										
Wale Wale	C									1							
	D									1							
Ivory Coast:																	
Bobo Dioulasso	C						1										
	D						1										
Grand Bassam	C									4							
Kong Circle	C							4									
Seguela	C												P				
Nigeria: Abakaliki	C										1						
	D										1						
Senegal: Podor (Hinterland)	C												1				
	D												1				
Sudan (French)	C							4	P								
Upper Volta:																	
Banfora	C								2								
	D								1								
Ouagadougou	C												1				

X

UNITED STATES TREASURY DEPARTMENT

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ISSUED WEEKLY

BY THE UNITED STATES PUBLIC HEALTH SERVICE

VOLUME 46 :: :: NUMBER 41

OCTOBER 9 - - - - 1931

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HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

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PUBLIC HEALTH REPORTS

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EXPERIMENTAL TRANSMISSION OF ENDEMIC TYPHUS FEVER OF THE UNITED STATES BY THE RAT FLEA (XENOPSYLLA CHEOPIS)

By R. E. Dyer, *Surgeon*, E. T. Ceder, *Assistant Surgeon*, A. Rumreich and L. F. Badger, *Passed Assistant Surgeons, United States Public Health Service*

The importance of the rat flea as a vector of endemic typhus fever in the United States has been shown by the recovery of the virus of this disease from fleas taken from wild rats trapped at typhus foci in Baltimore and Savannah (1) (2). The importance of these observations has been emphasized by the recovery of typhus virus from wild rats by Mooser, Castaneda, and Zinsser (3).

Kemp has recently confirmed our observations by the recovery of typhus virus from rat fleas taken at typhus foci in Texas (4).

A preliminary report on the transmission of endemic typhus virus from rat to rat by means of the rat flea (*Xenopsylla cheopis*) has been made (5). In the experiments described in that report fresh noninfected white rats were exposed in glass boxes to rats infected with endemic typhus and to rat fleas. The brains and spleens from the fresh rats, on inoculation into guinea pigs, produced a reaction clinically identical with the reaction of endemic typhus. These strains have since been shown to be identical with endemic typhus by the production of agglutinins for *proteus* X_{19}, type O, in monkeys and rabbits, by the presence of rickettsiae in smears from the tunica vaginalis of guinea pigs, by the presence of the typical lesions in the brains of guinea pigs, and by cross-immunity tests with known strains of endemic typhus. Since the publication of the preliminary report above mentioned, we have recovered the virus of endemic typhus from white rats exposed to infected rat fleas but not exposed to infected rats. In these experiments fleas (*Xenopsylla cheopis*) infected with typhus virus were placed in freshly sterilized boxes with fresh white rats. That the virus recovered from these fresh rats is the virus of endemic typhus has been shown by the production of agglutinins for *proteus* X_{19}, type O, in monkeys and rabbits, by the presence of rickettsiae in smears from the tunica vaginalis of guinea pigs, by the presence of the typical pathological lesions of endemic typhus in the brains of guinea pigs, and by cross-immunity tests with known strains of endemic typhus.

It has further been found that the typhus virus is present in the flea for at least nine days after feeding on infected rats.

Typhus virus has also been repeatedly recovered from the feces of infected fleas. Rickettsiae have been observed in smears from infected fleas.

CONCLUSION

The virus of endemic typhus has been experimentally transmitted from rat to rat by means of the rat flea (*Xenopsylla cheopis*).

REFERENCES

(1) Dyer, R. E., Rumreich, A., and Badger, L. F.: Pub. Health Rep., **46**: 334, Feb. 13, 1931.
(2) Dyer, R. E., Rumreich, A., and Badger, L. F.: Jour. Am. Med. Assn., **97**: 589, Aug. 29, 1931.
(3) Mooser, H., Castaneda, M. R., and Zinsser, H.: Jour. Am. Med. Assn., **97**: 231, July 25, 1931.
(4) Kemp, H. A.: J. Am. Med. Assoc., **97**: 775, Sept. 12, 1931.
(5) Dyer, R. E., Ceder, E. T., Rumreich, A., and Badger, L. F.: Pub. Health Rep., **46**: 1869, Aug. 7, 1931.

AGGLUTININ ABSORPTION IN UNDULANT FEVER (BRUCELLOSIS)[1]

By Edward Francis, *Medical Director, United States Public Health Service*

Likeness is the quality which has combined into the one genus, *Brucella*, the three microorganisms which affect primarily goat, cow, and hog, but which are transmissible to man and other animals.

Table 1.—*Comparison of two methods of classification*

Culture	Pathological source of culture	Classification of culture by the National Institute of Health by reciprocal agglutinin absorption	Classification of cultures by Dr. I. F. Huddleson by the bacteriostatic action of dyes
428	(?) Human	Melitensis	Melitensis.
McC	Cow's milk	do	Bovine abortus.
H-1	Cervical seal of cow	do	Do.
41-2	Human blood	do	Do.
H-5	Cow's milk	do	Do.
B-8	Bovine fetus	do	Do.
C-15	Cow's milk	do	Do.
89	Human blood	do	Melitensis.
R. H. W.	do	do	Do.
E. F.-1	do	do	Do.
W. T. H.-1	do	do	Do.
456	Cow's fetus	Abortus	Bovine abortus.
C-10	Cow's milk	do	Do.
88	Human blood	do	Do.
633	Bovine fetus	do	Do.
634	do	do	Melitensis.
635	do	do	Do.
426	(?) Human	do	Do.
L. Z.	Human blood	do	Porcine abortus.
E. M.	Human abscess	do	Do.
A. B. C.	Human blood	do	Do.
41-1	do	do	Do.

[1] From the National Institute of Health, formerly the Hygienic Laboratory, Washington, D. C.

Differences must necessarily be found as a basis for separation into species. Hence, the striving to find differential characters which might serve to trace each organism, wherever found, back to its original source—goat, cow, or hog. Differences have been sought in cultural characteristics, serological reactions, pathological changes, hydrogen sulphide metabolism, bacteriostatic action of dyes, and utilization of dextrose.

TABLE 2.—*Absorption of agglutinins from* melitensis *type serum and from* abortus *type serum by cultures to be classified*

Type serum	Agglutination of cultures																				
	Brucella abortus type culture 456								Brucella melitensis type culture 428								Culture to be classified				
	10	20	40	80	160	320	640	1280	10	20	40	80	160	320	640	1280		10	20	40	80
MELITENSIS TYPE SERUM 428																					
Not absorbed	4	4	4	4	4	4	1	0	4	4	4	4	4	4	3	0	--	--	--	--	--
Absorbed by—																					
Melitensis 428	0	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	--	--	--	--	--
Culture McC	0	0	0	0	0	0	--	--	1	0	0	0	0	0	--	--	McC	0	0	0	0
Culture H-1	1	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	H-1	0	0	0	0
Culture 41-2	3	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	41-2	0	0	0	0
Culture H-5	0	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	H-5	0	0	0	0
Culture B-8	0	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	B-8	0	0	0	0
Culture C-15	0	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	C-15	0	0	0	0
Culture 89	0	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	89	0	0	0	0
Culture R. H. W	0	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	R. H. W.	0	0	0	0
Culture E. F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	E. F	--	--	--	--
Culture W. T. H	1	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	W. T. H.	0	0	0	0
Abortus 456	0	0	0	0	0	0	--	--	4	4	4	4	1	0	--	--	--	--	--	--	--
Culture C-10	0	0	0	0	0	0	--	--	4	4	4	4	0	0	--	--	C-10	--	--	--	--
Culture 88	0	0	0	0	0	0	--	--	4	4	4	4	0	0	--	--	88	1	0	0	0
Culture 633	1	0	0	0	0	0	--	--	4	4	4	4	4	0	--	--	633	1	C	0	0
Culture 634	0	0	0	0	0	0	--	--	4	4	4	3	0	0	--	--	634	1	C	0	0
Culture 635	2	0	0	0	0	0	--	--	4	4	4	4	3	0	--	--	635	1	0	0	0
Culture 426	0	0	0	0	0	0	--	--	4	4	4	4	1	0	--	--	426	0	0	0	0
Culture L. Z	0	0	0	0	0	0	--	--	4	4	4	4	0	0	--	--	L. Z	0	0	0	0
Culture E. M	0	0	0	0	0	0	--	--	--	4	4	4	1	0	--	--	E. M	--	0	0	0
Culture A. B. C	0	0	0	0	0	0	--	--	4	4	4	4	0	0	--	--	A. B. C.	0	0	0	0
Culture 41-1	0	0	0	0	0	0	--	--	--	4	4	4	0	0	--	--	41-1	0	0	0	0
ABORTUS TYPE SERUM 456																					
Not absorbed	4	4	4	4	4	4	4	1	4	4	4	4	4	4	1	0	--	--	--	--	--
Absorbed by—																					
Melitensis 428	4	4	4	4	4	4	0	0	0	0	0	0	0	0	--	--	--	--	--	--	--
Culture McC	3	4	4	4	4	0	--	--	0	0	0	0	0	0	--	--	McC	3	0	0	0
Culture H-1	4	4	4	4	1	0	--	--	0	0	0	0	0	0	--	--	H-1	0	0	0	0
Culture 41-2	--	4	4	4	4	0	--	--	0	0	0	0	0	0	--	--	41-2	2	2	0	0
Culture H-5	4	--	4	4	4	0	--	--	0	0	0	0	0	0	--	--	H-5	0	0	0	0
Culture B-8	4	4	4	4	0	0	--	--	0	0	0	0	0	0	--	--	B-8	0	0	0	0
Culture C-15	4	4	4	4	4	4	0	0	0	0	0	0	0	0	--	--	C-15	0	0	0	0
Culture 89	4	4	4	4	3	0	--	--	0	0	0	0	0	0	--	--	89	1	0	0	0
Culture R. H. W.	4	4	4	4	4	4	0	0	0	0	0	0	0	0	--	--	R H. W.	0	0	0	0
Culture E. F	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	E. F	--	--	--	--
Culture W. T. H	4	4	4	4	4	0	--	--	1	0	0	0	0	0	--	--	W. T. H.	0	0	0	0
Abortus 456	0	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	--	--	--	--	--
Culture C-10	0	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	C-10	--	--	--	--
Culture 88	0	0	0	0	0	0	--	--	1	0	0	0	0	0	--	--	88	2	0	0	0
Culture 633	0	0	0	0	0	0	--	--	2	0	0	0	0	0	--	--	633	1	0	0	0
Culture 634	3	0	0	0	0	0	--	--	1	0	0	0	0	0	--	--	634	2	0	0	0
Culture 635	0	0	0	0	0	0	--	--	1	0	0	0	0	0	--	--	635	1	0	0	0
Culture 426	0	0	0	0	0	0	--	--	2	0	0	0	0	0	--	--	426	0	0	0	0
Culture L. Z	0	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	L. Z	0	0	0	0
Culture E. M	0	0	C	0	0	0	--	--	0	0	0	0	0	0	--	--	E. M	1	0	0	0
Culture A. B. C	0	0	0	0	0	0	--	--	0	0	0	0	0	0	--	--	A. B. C.	0	0	0	0
Culture 41-1	0	0	C	0	0	0	--	--	1	0	0	0	0	0	--	--	41-1	0	0	0	0

With the view of testing the agreement of two methods of classification, an exchange of cultures under key numbers was effected between Dr. I. Forest Huddleson, of East Lansing, Mich., and the National Institute of Health, each being furnished with the history of a culture only after rendering a report upon its key number.

Table 1 shows the classification of 22 *Brucella* cultures by the method of agglutinin absorption at the National Institute of Health, in comparison with the classification of the same cultures by the bacteriostatic action of dyes in the hands of Doctor Huddleson. The results of the two methods are not exactly comparable, because the agglutinin absorption test makes no claim of being able to separate bovine *abortus* from porcine *abortus*, of which latter there were four cultures, according to the dye method. Of the remaining 18 cultures there was agreement in the classification of 9 and disagreement in the classification of 9. The latter 9 are therefore the cultures of greatest interest, 6 of which reacted as *melitensis* by agglutinin absorption but reacted as bovine *abortus* to the dyes, while the remaining 3 reacted as *abortus* by absorption, but reacted as *melitensis* to the dyes. Which method is entirely correct, if either, is not clear.

TECHNIQUE

The method employed in performing agglutinin absorption tests was essentially that used by Alice C. Evans (1).

Antiserums.—Type serums were prepared from rabbits by the intravenous injection of type cultures of *Brucella abortus* 456 and *Brucella melitensis* 428. For the purpose of reciprocal absorption tests, rabbit serums were prepared with each of the cultures to be classified. A uniform titer of 1:640 against the organism injected is desirable in all serums which are to be absorbed, because this contributes very materially to uniformity in results, thus aiding in the interpretation of results.

Six days after a single intravenous injection of a killed culture, a preliminary test of aggultinins was made on a sample of blood taken from the ear. This test usually showed a titer of 1:640, or a little higher, against the organism injected; in this case the rabbit was etherized and bled to death from the heart or carotid artery on the sixth day. If the titer on the sixth day was only 1:320, killing was postponed two or three days. In the latter case the titer frequently reached 1:1280 or 1:2560.

An occasional poor agglutinogenic culture required two or three injections, separated by intervals of two days, in order to produce a titer of 1:640 in a rabbit. The material for each injection consisted of 0.2 c. c. of a formalin-killed concentrated stock suspension of organisms having a turbidity of 25,000 according to the silica standard. This amount of antigen was diluted with physiological

saline solution to a volume of 2 c. c. and injected slowly into the marginal vein of a rabbit's ear.

Clearness of a serum and freedom from opalescence are promoted by withholding all food from a rabbit for 24 to 48 hours before bleeding. Serums used in these studies were preserved by adding only a small platinum loopful of pure tricresol to each 5 c. c. of serum. Glycerin is not only a good preservative but has the advantage of clearing a cloudy serum. An equal amount of pure undiluted neutral glycerin should be added to a serum if glycerin is used as a preservative. Serums were not inactivated. Preserved serums were stored at 10° C.

Preparation of stock antigens.—All cultures were grown on beef infusion glucose agar in Blake bottles for three days at 37° C. Each bottle was inoculated with the entire growth from a glucose agar slant suspended in 1 c. c. of saline solution. In case an organism required carbon dioxide, several cotton-stoppered Blake bottles were placed within a large desiccator, the air was exhausted from the desiccator, a volume of carbon dioxide was admitted approximately equal to 10 or 15 per cent of the volume of the desiccator, and finally air was admitted to replace all vacuum. At the end of 72 hours the growth was washed off in saline solution containing 1 per cent commercial formalin, using 20 c. c. per Blake bottle. After standing six days the formalinized suspension of organisms was thrown down in the centrifuge, the clear supernatant fluid was poured off, and the bacterial mass was resuspended in saline solution containing 0.5 per cent of formalin and standardized to a turbidity of 25,000. Formalinized, concentrated, stock antigens which had been stored for two years at 10° C. have given satisfactory results in absorption tests and in ordinary agglutination tests. Absorption tests were not done with heat-killed or with living antigens.

If virulent cultures are used in making antigens, great care should be exercised in determining the death of the organisms in the 0.5 per cent formalin suspension, by sterility tests on glucose agar slants, before allowing laboratory workers to use the antigen for agglutination tests or for intravenous injection of rabbits.

Turbidity standard.—Stock antigens suspended in physiologic saline solution containing 0.5 per cent formalin were standardized to a turbidity of 25,000 according to the Standard Methods of Water Analysis, published by the American Public Health Association (1925).

An agglutinin absorption test.—In setting up an absorption test a balance must be observed between the titer of the serum, the amount of the serum used, the amount of bacteria (absorbing dose), and the total volume of the whole mixture. The unit amount of serum used in a test was 0.5 c. c. of a serum having a titer of 1:640; the unit amount of bacteria employed was the bacterial mass contained in

6 c. c. of a suspension having a turbidity of 25,000, and the total volume of the test was 2.5 c. c. In this combination the ingredients are so balanced that the serum, after absorption by the bacterial dose, will no longer agglutinate the absorbing culture. This phase of the test is shown in each test in Tables 2 and 3.

Preserved antiserums having a natural titer of 1: 640 were ready for absorption without adjustment of titer, but if the titer was 1:1280 or 1: 2560, then an amount of such a serum necessary for the test was diluted at the time of testing with sufficient saline solution to reduce its titer to 1: 640. The unit amount of a 640 serum used in a test was 0.5 c. c., but this was diluted 1: 5 with saline solution, which gave it a volume of 2.5 c. c.

Stock antigens killed with formalin and standardized to a turbidity of 25,000 were measured out, 6 c. c. to a centrifuge tube, to which was then added about 25 c. c. of saline solution for the purpose of "washing" the bacteria. The bacteria were thrown down in the centrifuge, the clear supernatant fluid was poured off, and to the bacterial sediment were added 2.5 c. c. of a 1: 5 dilution of a serum whose titer was 1: 640. Thorough mixing of serum and bacterial sediment in the centrifuge tubes was obtained by stirring with a capillary pipette, into which the mixture was alternately sucked and rapidly expelled. The centrifuge tubes were then covered with rubber caps to prevent evaporation and were incubated in a water bath at a temperature of 37° to 42° C. for six hours, after which they were transferred to the cold room at 10° C. overnight. During absorption in the water bath the mixtures were agitated several times. The centrifuge tubes were not calibrated nor was any correction made for saline remaining in the packed bacteria mass, as the error from that source was considered to be not only very small but constant for all tests.

Ordinary agglutination tests were performed the next morning, testing the absorbed serum for agglutination of the type *abortus* culture, the type *melitensis* culture, and the culture to be classified as follows: The rubber-capped tubes were centrifuged for about an hour and a quarter. The clear absorbed serum was pipetted off and set up in 0.5 c. c. amounts in agglutination tubes in dilutions of 1: 5, 10, 20, 40, 80, and 160, remembering that the absorbed serum was already in dilution of 1:15. To each tube was then added 0.5 c. c. of the formalinized stock antigen, the turbidity of which had been reduced from 25,000 to 500 by adding 1 part of the concentrated antigen to 49 parts of saline solution so that the final turbidity in the agglutination tubes was 250. It was kept in mind that the absorbed serum was a 1: 5 dilution of a 640 serum, and therefore the addition of 0.5 c. c. of diluted antigen to 0.5 c. c. of the diluted absorbed serum produced

a final dilution of serums in the agglutination tubes to 1: 10, 20, 40, 80, 160, and 320.

Incubation of the agglutination tubes was at 37° to 42° C. in the water bath for two and one-half hours. They were then placed in the cold room at 10° C. overnight and recorded the next morning. Since the agglutination phase is usually not completed by the next morning it is advisable to allow the test to remain at room temperature for 24 additional hours if complete results are desired. Complete sedimentation of bacteria and water-clear supernatant fluid were indicated by 4. Lesser degrees of clearing were indicated by 3, 2, and 1. All serums in a test were absorbed only once. No sample of serum was reabsorbed.

INTERPRETATION OF ABSORPTION TESTS

By reference to Table 2 one sees the following reactions between type serums 428 and 456 and their type cultures 428 and 456: (1) Either type serum (unabsorbed) agglutinated both type cultures completely or partially in dilution of 1:640. (2) Either type serum after absorption by its homologous culture lost all agglutinins for both type cultures. (3) Either type serum after absorption by the heterologous type culture lost all agglutinins for the heterologous culture but still agglutinated its homologous culture to a considerable degree, thus showing that the two type cultures were serologically different.

Using type *melitensis* serum 428 and type *abortus* serum 456 as a basis for classification of the cultures to be studied, the following results were obtained: (1) A culture which absorbed from type serum 428 all agglutinins for type cultures 428 and 456 and for itself was regarded as similar serologically to type culture 428. (2) A culture which absorbed from type serum 456 all agglutinins for type cultures 456 and 428 and for itself was regarded as similar serologically to type culture 456. On this basis of classification the first 10 cultures of Table 2 down to and including culture W. T. H. are similar serologically to *Brucella melitensis* 428, and the last 10 cultures at the end of Table 2 are similar serologically to *Brucella abortus* 456.

Culturally, the members of either group of 10 cultures differed among themselves in regard to the carbon dioxide requirement of isolation.

INTERPRETATION OF RECIPROCAL ABSORPTION TESTS

Table 2 presents the results of absorption of agglutinins from type serums by the cultures to be classified. Table 3 presents the absorption of agglutinins by the type cultures from antiserums of the cultures to be classified.

The *first 10 cultures* of Table 2 are represented in Table 3 by rabbit serums 1, 4, 8, 9, 10, 11, 12, 14, 15, and 17, all of which reacted as

melitensis serums as follows: (1) Each serum (unabsorbed) agglutinated both type cultures and its own homologous culture completely or partially in dilution of 1:640. (2) Each serum after absorption by its homologous culture lost all agglutinins for both type cultures and for its homologous culture. (3) Each serum after absorption by type *abortus* culture 456 lost all agglutinins for 456 but still agglutinated to a considerable degree type *melitensis* culture 428 and its own homologous culture, thus showing that it was different from the type *abortus* serum. (4) Each serum after absorption by type *melitensis* culture 428 lost all agglutinins for *melitensis* 428, for *abortus* 456, and for its own homologous culture, thus showing that each serum was similar to type *melitensis* serum 428.

The *last 10 cultures* at the bottom of Table 2 are represented in Table 3 by rabbit serums 18 to 27, all of which reacted as *abortus* serums as follows: (1) Each serum (unabsorbed) agglutinated both type cultures and its own homologous culture completely or partially in dilution of 1:640. (2) Each serum after absorption by its homologous culture lost all agglutinins for both type cultures and for its homologous culture. (3) Each serum after absorption by type *melitensis* culture 428 lost all agglutinins for 428 but still agglutinated to a considerable degree type *abortus* culture 456 and its own homologous culture, thus showing that the serum was different from the type *melitensis* serum. (4) Each serum after absorption by type *abortus* culture 456 lost all agglutinins for *abortus* 456, for *melitensis* 428, and for its own homologous culture, thus showing that each serum was similar to type *abortus* serum 456.

TABLE 3.—*Reciprocal absorption of agglutinins from antiserums of cultures to be classified*

Antiserums of cultures to be classified	Agglutination of cultures																							
	Brucella abortus type culture 456								Brucella melitensis type culture 428								Culture to be classified							
	10	20	40	80	160	320	640	1280	10	20	40	80	160	320	640	1280	10	20	40	80	160	320	640	1280
																	Culture McC.							
(1) McC. rabbit serum:																								
Not absorbed	4	4	4	4	4	4	1	0	4	4	4	4	4	4	2	0	4	4	4	4	4	4	4	3
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	4	4	4	4	4	1	----	----	4	4	4	4	4	4	0	0
Melitensis 428	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
Culture McC	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	3	0	0	0	0	0	----	----
(2) McC. cow serum:																								
Not absorbed	4	4	4	4	4	4	4	0	4	4	4	4	4	4	2	0	4	4	4	4	4	4	4	1
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	4	4	4	4	4	0	----	----	4	4	4	4	4	3	----	----
Melitensis 428	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
Culture McC	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
(3) McC. guinea-pig serum:																								
Not absorbed	4	4	4	4	4	4	0	0	4	4	4	4	4	4	4	0	4	4	4	4	4	4	4	1
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	4	4	4	4	4	0	----	----	4	4	4	4	4	0	----	----
Melitensis 428	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
Culture McC	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	1	0	0	0	0	0	----	----
																	Culture H-1							
(4) H-1 rabbit serum:																								
Not absorbed	4	4	4	4	4	4	1	0	4	4	4	4	4	4	4	0	4	4	4	4	4	4	4	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	4	4	4	4	3	0	----	----	4	4	4	4	3	0	----	----
Melitensis 428	3	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
Culture H-1	2	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
(5) H-1 human serum (J. J. H.):																								
Not absorbed	----	4	4	4	2	0	0	0	----	4	4	4	4	1	0	0	----	4	4	4	4	0	0	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	4	4	4	4	2	0	----	----	4	4	4	4	0	0	----	----
Melitensis 428	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
(6) H-1 cow serum:																								
Not absorbed	----	4	4	4	4	4	2	0	----	4	4	4	4	4	4	0	4	4	4	4	4	4	4	2
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	4	4	4	0	0	0	----	----	----	----	----	----	----	----	----	----
Melitensis 428	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	----	----	----	----	----	----	----	----
(7) H-1 guinea-pig serum:																								
Not absorbed	----	4	4	4	4	4	4	0	----	4	4	4	4	4	4	1	----	----	----	----	----	----	----	----
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	4	4	4	3	0	0	----	----	----	----	----	----	----	----	----	----
Melitensis 428	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	----	----	----	----	----	----	----	----

TABLE 3.—*Reciprocal absorption of agglutinins from antiserums of cultures to be classified*—Continued

Antiserums of cultures to be classified	Agglutination of cultures: Brucella abortus type culture 456								Brucella melitensis type culture 428								Culture to be classified								
	10	20	40	80	160	320	640	1280	10	20	40	80	160	320	640	1280		10	20	40	80	160	320	640	1280
(8) 41-2 rabbit serum: Not absorbed	4	4	4	4	4	4	1	0	4	4	4	4	4	4	3	0	Culture 41-2	4	4	4	4	4	4	4	0
																	Culture 41-1	4	4	4	4	4	4	2	0
Absorbed by— Abortus 456	0	0	0	0	0	0	----	----	4	4	4	4	4	0	----	----	Culture 41-2	4	4	4	4	0	0	----	----
Melitensis 428	2	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----		0	0	0	0	0	0	----	----
Culture 41-2	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----		0	0	0	0	0	0	----	----
																	Culture 41-1	1	0	0	0	0	0	----	----
Culture 41-1	1	0	0	0	0	0	----	----	4	4	4	4	4	0	----	----	Culture 41-2	4	4	4	4	0	0	----	----
																	Culture 41-1	0	0	0	0	0	0	----	----

																	Culture H-5							
(9) H-5 rabbit serum:																								
Not absorbed	----	4	4	4	4	4	2	0	----	4	4	4	4	4	3	0	----	4	4	4	4	4	4	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	4	4	4	4	0	0	----	----	4	4	4	4	2	0	----	----
Melitensis 428	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
Culture H-5	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
																	Culture B-8							
(10) B-8 rabbit serum:																								
Not absorbed	4	4	4	4	4	4	0	0	4	4	4	4	4	4	3	0	4	4	4	4	4	4	0	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	4	4	4	4	0	0	----	----	4	4	4	2	0	0	----	----
Melitensis 428	1	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
Culture B-8	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
																	Culture C-15							
(11) C-15 rabbit serum:																								
Not absorbed	----	4	4	4	4	4	4	0	----	4	4	4	4	4	3	0	----	4	4	4	4	4	3	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	4	4	4	4	0	0	----	----	3	4	4	4	0	0	----	----
Melitensis 428	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
Culture C-15	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
																	Culture 89							
(12) 89 rabbit serum:																								
Not absorbed	----	4	4	4	4	4	3	0	----	4	4	4	4	4	2	0	----	4	4	4	4	4	4	0
																	Culture 88							
																	4	4	4	4	4	4	4	0
																	Culture 89							
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	4	4	4	1	0	0	----	----	4	4	4	4	0	0	----	----
Melitensis 428	1	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
Culture 89	2	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----

TABLE 3.—*Reciprocal absorption of agglutinins from antiserums of cultures to be classified*—Continued

Antiserums of cultures to be classified	Agglutination of cultures																							
	Brucella abortus type culture 456								Brucella melitensis type culture 428								Culture to be classified							
	10	20	40	80	160	320	640	1280	10	20	40	80	160	320	640	1280	10	20	40	80	160	320	640	1280
(12) 89 rabbit serum—Continued. Absorbed by—Continued.																	Culture 88							
																	0	0	0	0	0	0	----	----
																	Culture 89							
Culture 88	0	0	0	0	0	0	----	----	4	4	4	1	0	0	----	----	1	4	4	4	0	0	----	----
																	Culture 88							
																	0	0	0	0	0	0	----	----
																	Culture 89							
(13) 89 human serum (C. G.): Not absorbed	----	----	4	4	4	4	0	0	----	----	4	4	4	4	1	0	----	----	----	----	----	----	----	----
Absorbed by— Abortus 456	1	0	0	0	0	0	----	----	4	4	2	0	0	0	----	----	----	4	3	0	0	0	----	----
Melitensis 428	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	----	0	0	0	0	0	----	----
Culture 89	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
																	Culture 88							
																	0	0	0	0	0	0	----	----
																	Culture 89							
Culture 88	4	1	0	0	0	0	----	----	4	4	4	1	0	0	----	----	4	4	4	3	0	0	----	----

																	Culture 88							
																	4	0	0	0	0	0	-----	-----
																	Culture R. H. W.							
(14) R. H. W. rabbit serum:																								
Not absorbed	-----	4	4	4	4	4	1	0	-----	4	4	4	4	4	4	0	-----	4	4	4	4	4	3	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	-----	-----	4	4	4	4	4	0	-----	-----	4	4	4	4	4	0	-----	-----
Melitensis 428	3	0	0	0	0	0	-----	-----	2	0	0	0	0	0	-----	-----	4	0	0	0	0	0	-----	-----
Culture R. H. W	1	0	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----
																	Culture E. F.							
(15) E. F. rabbit serum:																								
Not absorbed	4	4	4	4	4	4	4	3	4	4	4	4	4	4	4	1	4	4	4	4	4	4	4	1
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	0	-----	-----	4	4	4	0	0	0	-----	-----	4	4	4	4	0	0	-----
Melitensis 428	-----	0	0	0	0	0	0	-----	0	0	0	0	0	0	-----	-----	-----	0	0	0	0	0	0	-----
Culture E. F	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
(16) E. F. human serum:																								
Not absorbed	4	4	4	4	4	3	0	0	4	4	4	4	4	4	0	0	4	4	4	4	4	4	4	0
Absorbed by—																								
Abortus 456	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Melitensis 428	2	0	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----
Culture E. F	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
																	Culture W. T. H.							
(17) W. T. H. rabbit serum:																								
Not absorbed	4	4	4	4	4	4	4	1	4	4	4	4	4	4	4	1	4	4	4	4	4	4	4	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	-----	-----	4	4	4	4	0	0	-----	-----	4	4	4	4	0	0	-----	-----
Melitensis 428	4	1	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----
Culture W. T. H	0	0	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----
																	Culture C-10							
(18) C-10 rabbit serum:																								
Not absorbed	-----	4	4	4	4	4	4	1	-----	4	4	4	4	4	1	0	-----	4	4	4	4	4	4	1
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----
Melitensis 428	4	4	4	4	4	0	-----	-----	1	0	0	0	0	0	-----	-----	4	4	4	4	3	0	-----	-----
Culture C-10	0	0	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----	0	0	0	0	0	0	-----	-----

TABLE 3.—*Reciprocal absorption of agglutinins from antiserums of cultures to be classified*—Continued

Antiserums of cultures to be classified	Agglutination of cultures: Brucella abortus type culture 456								Brucella melitensis type culture 428								Culture to be classified								
	10	20	40	80	160	320	640	1280	10	20	40	80	160	320	640	1280		10	20	40	80	160	320	640	1280
(19) 88 rabbit serum: Not absorbed	4	4	4	4	4	4	3	0	4	4	4	4	4	4	3	0	Culture 88	4	4	4	4	4	4	4	1
																	Culture 89	4	4	4	4	4	4	3	0
Absorbed by—																									
Abortus 456	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	Culture 88	0	0	0	0	0	0	----	----
Melitensis 428	4	4	4	4	4	0	----	----	0	0	0	0	0	0	----	----		4	4	4	4	4	1	----	----
Culture 88	4	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----		4	0	0	0	0	0	----	----
																	Culture 89	0	0	0	0	0	0	----	----
Culture 89	4	4	4	3	0	0	----	----	0	0	0	0	0	0	----	----	Culture 88	4	4	4	4	4	0	----	----
																	Culture 89	0	0	0	0	0	0	----	----

																	Culture 633							
(20) 633 rabbit serum:																								
Not absorbed	4	4	4	4	4	4	3	0	4	4	4	4	4	4	3	0	4	4	4	4	4	4	4	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	1	0	0	0	0	0	----	----
Melitensis 428	4	4	4	4	3	0	----	----	0	0	0	0	0	0	----	----	4	4	4	4	4	0	----	----
Culture 633	0	0	0	0	0	0	----	----	1	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
																	Culture 634							
(21) 634 rabbit serum:																								
Not absorbed	4	4	4	4	4	4	4	1	4	4	4	4	4	4	4	0	4	4	4	4	4	3	0	----
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
Melitensis 428	4	4	4	4	3	0	----	----	0	0	0	0	0	0	----	----	4	4	4	3	1	0	----	----
Culture 634	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
																	Culture 635							
(22) 635 rabbit serum:																								
Not absorbed	4	4	4	4	4	4	3	0	4	4	4	4	4	4	3	0	4	4	4	4	4	4	4	2
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
Melitensis 428	4	4	4	4	3	0	----	----	0	0	0	0	0	0	----	----	4	4	4	4	4	0	----	----
Culture 635	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
																	Culture 426							
(23) 426 rabbit serum:																								
Not absorbed	4	4	4	4	4	4	2	0	4	4	4	4	4	4	1	0	4	4	4	4	4	4	4	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
Melitensis 428	4	4	4	4	4	1	0	0	1	0	0	0	0	0	----	----	4	4	4	4	4	3	0	0
Culture 426	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----
																	Culture L. Z.							
(24) L. Z. rabbit serum:																								
Not absorbed	----	4	4	4	4	4	1	0	----	4	4	4	4	4	2	0	----	4	4	4	4	4	4	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	----	----	----	----	----	----	----
Melitensis 428	----	4	4	4	3	0	----	----	0	0	0	0	0	0	----	----	----	4	4	4	4	0	----	----
Culture L. Z.	0	0	0	0	0	0	----	----	----	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----

TABLE 3.—*Reciprocal absorption of agglutinins from antiserums of cultures to be classified*—Continued

Antiserums of cultures to be classified	Agglutination of cultures																							
	Brucella abortus type culture 456								Brucella melitensis type culture 428								Culture to be classified							
	10	20	40	80	160	320	640	1280	10	20	40	80	160	320	640	1280	10	20	40	80	160	320	640	1280
																	Culture E. M.							
(25) E. M. rabbit serum:																								
Not absorbed	4	4	4	4	4	4	2	0	4	4	4	4	4	4	0	0	4	4	4	4	4	4	3	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	3	0	0	0	0	0	----	----
Melitensis 428	4	4	4	4	1	0	----	----	0	0	0	0	0	0	----	----	4	4	4	4	0	0	----	----
Culture E. M.	1	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	3	0	0	0	0	0	----	----
																	Culture A. B. C.							
(26) A. B. C. rabbit serum:																								
Not absorbed	----	4	4	4	4	4	4	0	----	4	4	4	4	4	2	0	----	4	4	4	4	4	4	0
Absorbed by—																								
Abortus 456	0	0	0	0	0	0	----	----	0	0	0	0	----	----	----	----	0	----	----	----	----	----	----	----
Melitensis 428	4	4	4	4	4	3	----	----	0	0	0	0	0	0	----	----	4	4	4	4	4	3	----	----
Culture A. B. C.	0	0	0	0	----	----	----	----	0	0	0	0	----	----	----	----	0	----	----	----	----	----	----	----
																	Culture 41-1							
(27) 41-1 rabbit serum:																								
Not absorbed	4	4	4	4	4	4	4	0	4	4	4	4	4	4	3	0	4	4	4	4	4	4	4	1
																	Culture 41-2							
																	4	4	4	4	4	4	4	0
																	Culture 41-1							
Absorbed by—																								
Abortus 456	1	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	1	0	0	0	0	0	----	----
Melitensis 428	3	4	4	4	3	0	----	----	0	0	0	0	0	0	----	----	----	4	4	4	4	0	----	----
Culture 41-1	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----	0	0	0	0	0	0	----	----

Culture 41-2	4	4	4	4	4	1	-----	-----	0	0	0	0	0	0	-----	-----	Culture 41-2	1	0	0	0	0	0	-----	-----
																	Culture 41-1	4	4	4	4	4	4	0	0
																	Culture 41-2	0	0	0	0	0	0	-----	-----

SERUMS OF COW, GUINEA PIG, AND MAN

The rabbit is the animal of choice for the preparation of antiserums for the study of cultures by agglutinin absorption, but in this study serums of cow, guinea pig, and man were available in connection with a few cultures.

Culture McC. was isolated from the milk of a cow by guinea pig inoculation, hence the serums of this cow and guinea pig were absorbed. (See Table 3, serums 2 and 3.) The results were in no way different from those obtained with the McC. rabbit serum; all reacted as *melitensis* serums.

Culture H-1 was isolated from a guinea pig after inoculation with the cervical seal of a cow whose milk had caused undulant fever in J. J. H. Serums of the man, cow, and guinea pig (see Table 3, serums 5, 6, and 7) reacted after absorption, as did the H-1 rabbit serum; all were *melitensis* serums.

Culture E. F. was isolated from the blood of E. F. directly on culture medium. The human serum E. F., after absorption with *melitensis* type culture 428 failed to agglutinate *melitensis* 428, *abortus* 456, and its homologous culture E. F., in which respect it reacted, as did the E. F. rabbit serum.

DISSIMILAR CULTURES ISOLATED FROM ONE INDIVIDUAL

(1) Cultures 41-1 and 41-2 (see histories of cultures) were isolated from different portions of the same sample of human blood, the former growing directly in air, the latter requiring carbon dioxide for isolation.

Culture 41-1 was classified as *abortus* by agglutinin absorption and as porcine *abortus* by the bacteriostatic action of dyes, but the absorption test does not distinguish between bovine *abortus* and porcine *abortus*.

Culture 41-2 was classified as *melitensis* by agglutinin absorption, as *Brucella abortus* (Bang) by the carbon dioxide requirement of isolation, and as bovine *abortus* by the bacteriostatic action of dyes.

The isolation from the same blood sample of two cultures differing from each other serologically and in the CO_2 requirement of isolation raised the question as to whether either culture might also contain organisms belonging to the other culture. The purity of both cultures, however, was established by the monovalent character of their respective rabbit antiserums. Neither antiserum after absorption by its homologous culture showed agglutinins for the other culture. (See Table 3, serums 8 and 27.)

(2) Cultures 88 and 89 (see histories of cultures) were isolated from the blood of human case C. G., the former requiring CO_2 for isolation while the latter grew directly in atmospheric air.

Culture 88 was classed as *abortus* by agglutinin absorption and as bovine *abortus* by the bacteriostatic action of dyes. Culture 89 was classed as *melitensis* both by absorption and by the dyes.

Neither culture contained a mixture of both organisms, as shown by the monovalent character of the rabbit serums prepared from each culture. (See Table 3, serums 12 and 19.)

The serum collected August 28, 1930, from the patient C. G., from whom both cultures were isolated June 10, 1930, reacted by agglutinin absorption as a *melitensis* serum. (See Table 3, serum 13.)

CONCLUSION

Chief interest in these studies centers about the serological reactions of certain cultures of *Brucella abortus* (Bang).

A *Brucella* organism which manifests the cultural character of requiring carbon dioxide for its isolation is *Br. abortus* (Bang), and yet certain ones of such cultures (McC., H–1, 41–2, H–5, and C–15) are shown by agglutinin absorption to give the *melitensis* A serological reaction of *Brucella melitensis* (Bruce). Any contention that agglutinin absorption is a reliable test for the differentiation of *Brucella abortus* of Bang from *Brucella melitensis* of Bruce is not supported by these studies.

PRESUMPTIVE DIFFERENTIAL TEST

Abortus and *melitensis* cultures may be quickly but only tentatively separated serologically by their agglutination in one or the other of the following previously absorbed serums: (1) A type *abortus* serum which has been absorbed by a type *melitensis* culture or (2) a type *melitensis* serum which has been absorbed by a type *abortus* culture.

The result of such an incomplete test is not to be taken as final evidence but only as suggestive.

HISTORIES OF CULTURES

Culture 428 is the type culture of the group designated *Brucella melitensis* variety *melitensis* A by Alice C. Evans (1), who received this strain in 1921 from Feusier and Meyer (2), in whose article it bears the designation of Group III, No. 7.

Culture McC. was isolated November 15, 1930, by Edward Francis, at the National Institute of Health, Washington, D. C., from the spleen of a guinea pig which had been inoculated intraperitoneally October 5 with 2 c. c. of "clear milk" from a cow belonging to Doctor McC., of Chillum, Md. The "clear milk" sample was expressed from the four quarters when the cow was two months dry and two months pregnant. The same organism was also isolated from nine other guinea pigs inoculated October 5 with the same milk sample from the McC. cow. From the 10 guinea pigs 71 cultures were isolated in an atmosphere containing approximately 10 per cent of carbon dioxide, while 71 control culture tubes similarly inoculated from the 10 guinea pigs, but incubated in atmospheric air,

remained sterile. Mrs. McC. became ill from drinking the cow's milk, and her blood serum was reported positive for undulant fever in dilution of 1:320 by the Maryland State Board of Health. Milk from the McC. cow for the inoculation of guinea pigs on October 5, 1930, was kindly furnished by Dr. W. E. Cotton, Director United States Agricultural Experiment Station, Bethesda, Md. For the serological reactions of cow, guinea pig, and rabbit serums, see tests (2), (3), and (1), Table 3.

Culture **H-1** was isolated in November, 1929, by Dr. F. P. Mathews, of Purdue University, Lafayette, Ind., from the spleen of a guinea pig which he injected with a portion of the cervical seal of a cow of the H. herd, which was about to calve. Doctor Mathews stated that "the organism was isolated in an atmosphere of carbon dioxide and did not grow in ordinary aerobic conditions" On receipt of the culture, December 6, 1929, at the National Institute of Health, it gave scant growth in atmospheric air but luxuriant growth in air containing 10 per cent CO_2. For the serological reactions of cow, owner (J. J. H.), guinea pig, and rabbit serums, see tests (6), (5), (7), and (4), Table 3. This unusual combination of material bearing on the identity of the H-1 culture is due to the interest and prompt action of Dr. Walter W. Lee (3), then assistant secretary of the Indiana State Board of Health.

Cultures **41-1** and **41-2** were isolated by Dr. I. H. Borts (4) in June, 1929, at Iowa City, Iowa, from blood of a case of undulant fever (WB) which terminated in death in August, 1929. Two blood specimens collected in June, 1929, both agglutinated *Brucella melitensis* variety *abortus* in dilution of 1:320. Culture 41-1 was isolated from that portion of a blood sample which was incubated in atmospheric air, while 41-2 was isolated from another portion of the same blood sample but which was incubated in a desiccator from which 10 per cent of the air had been displaced by carbon dioxide. On receipt of these cultures at the National Institute of Health, August 25, 1930, 41-1 grew well in atmospheric air, but 41-2 grew only in air containing 10 per cent carbon dioxide.

Culture **H-5** was isolated in an atmosphere of 10 per cent carbon dioxide by Dr. I. F. Huddleson, Michigan State College, East Lansing, Mich., September 20, 1930, from milk of a cow in the M. herd. On receipt of the culture at the National Institute of Health, October 6, 1930, it failed to grow in air but grew luxuriantly in 10 per cent CO_2. In January, 1931, the growth in atmospheric air occurred only at points of heaviest inoculum and not between these points.

Culture **B-8** was isolated January 10, 1924, by Dr. F. P. Mathews, Purdue University, Lafayette, Ind., from the stomach contents of a fetus of a cow by direct culture, and Doctor Mathews adds, "presumably by the use of increased CO_2 content, although no record is available in regard to this feature." On receipt of the culture at the National Institute of Health, November 10, 1929, it grew well in atmospheric air.

Cultures **C-10** and **C-15** were isolated under increased CO_2 content of the atmosphere in April, 1928, by Dr. F. P. Mathews (5), Purdue University, Lafayette, Ind., from two guinea pigs which had been inoculated, respectively, with milk from cow 10 and cow 15 of the Earlham College herd at Richmond, Ind. On June 11, 1928, Doctor Mathews forwarded these cultures to the National Institute of Health with the statement that "C-10 had not yet been trained to grow under aerobic conditions and C-15 had been trained to grow under aerobic conditions only with great difficulty."

Cultures **88** and **89** were isolated by Jordan and Borts (6), June 10, 1930, at Iowa City, Iowa, from the blood of a case of undulant fever (C. G.), a Mexican who had been in the United States but a few weeks. One sample of blood was divided into two portions. One portion, after inoculation into culture medium, was incubated under 10 per cent carbon dioxide tension and yielded culture 88,

which failed to grow in ordinary air. The other portion, after inoculation into culture medium, was incubated in ordinary air and yielded culture 89, which would grow as well in 10 per cent CO_2. On receipt at the National Institute of Health, July 1, 1930, 88 grew luxuriantly in air containing 10 per cent CO_2, but in atmospheric air growth occurred only at points of heaviest inoculum and not between such points. Culture 89 grew luxuriantly in atmospheric air. The patient's blood serum collected August 28, 1930, completely agglutinated *abortus* 456 and *melitensis* 428 in dilution of 1:320 and agglutinated *melitensis* 428 partially in dilution of 1:640.

Culture **R. H. W.** was isolated April 17, 1928, without the use of CO_2 by W. G. Carhart, pathologist, United States Veterans' Hospital, Whipple, Ariz., from the blood of a patient (R. H. W.) planted on blood agar, growth appearing on the third or fourth day after planting. R. H. W. was a rancher and stated that he probably contracted the infection by delivering aborting goats, since of 1,800 goats due to kid, 400 aborted. The patient's serum, collected May 29, 1928, agglutinated *abortus* 456, *melitensis* 428, and his own culture, R. H. W., in dilution of 1:640.

Culture **E. F.–1** was isolated from blood drawn November 13, 1928, from E. F. at Washington, D. C., by Surg. W. T. Harrison, who planted the blood clots into flasks of glucose (1 per cent) bouillon (200 c. c.) which were incubated in air at 37° C., and later subcultured to glucose agar slants in air. Onset of illness was November 6, 1928. The source of infection was probably recently isolated cultures with which E. F. was working in the laboratory and which were of melitensis, bovine, and porcine types. The patient's serum collected December 3, 1928, agglutinated *abortus* 456, *melitensis* 428, and his own culture, E. F., in dilution of 1:10240. The following cultures were similarly isolated by Doctor Harrison from blood drawn from E. F. on the dates indicated:

E. F.–2, November 23, 1928.
E. F.–3, December 3, 1928.
E. F.–4, December 11, 1928.
E. F.–5, December 19, 1928.
E. F.–6, January 4, 1929.

These cultures showed spontaneous sedimentation in 0.85 per cent sodium chloride solution.

Culture **W. T. H.–1** was isolated from blood drawn March 18, 1929, from W. T. H. at Washington, D. C., by Medical Director G. W. McCoy, who planted the blood clots into flasks of glucose (1 per cent) bouillon (200 c. c.) which were incubated in air at 37° C. and later subcultured to glucose agar slants in air. Onset of illness was March 10, 1929. The source of infection was probably one of six cultures which W. T. H. had isolated from blood which he drew from E. F. between November 13, 1928, and January 4, 1929, because W. T. H. had made no other contacts with other *Brucella* cultures at any time. The patient's serum collected March 18, 1929, agglutinated *abortus* 456 and *melitensis* 428, in dilution of 1:160. The following cultures were similarly isolated by Doctor McCoy from blood drawn from W. T. H. on the dates indicated:

W. T. H.–2, April 2, 1929.
W. T. H.–3, April 15, 1929.
W. T. H.–4, May 6, 1929.

Culture **456** was isolated in September, 1917, from a cow's fetus at Laurel, Md., and was received from the Bureau of Animal Industry, Department of Agriculture, Washington, D. C. (See Alice C. Evans (1).)

Cultures **633, 634,** and **635** were isolated by Doctor Zeller, in Germany, from aborted bovine fetuses in March and April, 1930. When received July 9, 1930,

at the National Institute of Health from Dr. I. F. Huddleson, East Lansing, Mich., the cultures grew well in atmospheric air.

Culture 428 is the type culture of the group designated *Brucella melitensis*, variety *abortus*, by Alice C. Evans (1), who received this culture in 1921 from Feusier and Meyer (2), in whose article it bears the designation of group I, No. 20.

Culture **L. Z.** was isolated by Edward Francis from the blood of L. Z., patient of Dr. Harry V. Paryzek, Cleveland, Ohio. On receipt of the whole-blood sample at the National Institute of Health, Washington, D. C., August 4, 1928, the clot was planted into 200 c. c. of glucose bouillon and incubated in atmospheric air. Subcultures were made on glucose agar slants and incubated in air. The patient's serum received August 4, 1928, agglutinated *abortus* 456 in dilution of 1:5120 and *melitensis* 428 in dilution of 1:2560. At the time he became ill the patient was employed in a sausage factory cutting up pork more frequently than he did beef.

Culture **E. M.** was isolated June 15, 1929, from E. M., a patient at the North Hudson Hospital, Weehawken, N. J. At the time of admission to hospital (April 2, 1929) the patient was employed on the hog feed farms at Secaucus, N. J. The source of the culture was the pus from a "fixation abscess" which had been produced on the abdominal wall of the patient in the region of the appendix. The pus was planted on culture medium June 15, 1929, and was incubated in atmospheric air.

Culture **A. B. C.** was isolated by Edward Francis, March 10, 1928, from the blood of A. B. C., a patient at the United States Naval Hospital, Washington, D. C. Twenty cubic centimeters of blood collected March 10, 1928, were allowed to clot in four portions of 5 c. c. each. The clots were planted each into 200 c. c. of glucose bouillon and incubated in atmospheric air. Subcultures were made to glucose agar slants and incubated in air. The serum collected March 10, agglutinated cultures 456 and 428 in dilution of 1:160, partial in 1:320. The same organism was isolated from the patient by the same technique on March 17, April 24, and June 1, 1928.

Culture **41-1.** (See above.)

Note: While this article was in press, *Culture* C. S. was isolated from human blood. It adds one more to the list of *Brucella abortus* (Bang) cultures which by agglutinin absorption give the *melitensis* A serological reaction of *Brucella melitensis* (Bruce).

Culture C. S. was one of 12 cultures isolated by Edward Francis, National Institute of Health, Washington, D. C., from the blood of C. S., a patient in the United States Marine Hospital, Detroit, Mich. (Dr. J. H. Linson in charge). Every step in the isolation of the culture was so controlled as to determine whether primary growth was dependent on the presence of carbon dioxide.

Samples of blood received September 15, 18, and 22, 1931, were planted on duplicate sets of culture media, one set being incubated in an atmosphere of 10 per cent carbon dioxide and the other in atmospheric air. Four cultures were isolated from each of the three blood samples, the 12 successful isolations being onmedia incubated in 10 per cent CO_2, whereas there were 12 failures to isolate a culture on the duplicate sets of media incubated in atmospheric air. The patient's serum collected September 2, 1931, agglutinated *Brucella abortus* 456 in dilution of 1:640 and *Brucella melitensis* 428 in dilution of 1:1,280. By agglutinin absorption, the patient's serum reacted as a *melitensis* serum.

REFERENCES

(1) Evans, Alice C.: The Serological Classification of Brucella Melitensis from Human, Bovine, Caprine, Procine, and Equine Sources. Pub. Health Rep., 38: 1948–1963 (Aug. 24, 1923). Studies on Brucella (alkaligenes) melitensis. Hygienic Laboratory Bulletin No. 143 (1925).
(2) Feusier, M. L., and Meyer, K. F.: J. Infect. Dis., 27: 185–206 (1920).
(3) Lee, Walter W.: Undulant Fever in Indiana. Monthly Bulletin, Indiana State Board of Health, 33: 21–22 (February, 1930).
(4) Hardy, Jordan, Borts, and Hardy: Pub. Health Rep., 45: 2525 (Oct. 17, 1930). (Appendix, Case 4 D, p. 2563.) National Institute of Health Bulletin No. 158, p. 80 (1930).
(5) Farbar, M. E., and Mathews, F. P.: An epidemic of Undulant Fever, with a Study of the Associated Milk Supply. Annals of Internal Medicine, 2: 875–880 (March, 1929).
(6) Jordan, C. F., and Borts, I. H.: Pub. Health Rep., 46: 2437–2443 (Oct. 9, 1931).

DOUBLE INFECTION BY ORGANISMS OF THE BRUCELLA GROUP

Report of a Case

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In the literature on undulant or Malta fever there are numerous case reports. With the exception of one case reported by Hardy, Jordan, Borts, and Hardy (1), all have been regarded as infections by a single variety or species of the *Brucella* group. We present here a report of another patient with undulant fever, from whose blood culture two varieties (*abortus* and *melitensis*) of *Brucella melitensis* were isolated.

CASE REPORT

C. G., male, age 30, Mexican laborer, admitted to the Santa Fe Hospital, Fort Madison, Iowa, on May 9, 1930.

History.—For one week previous patient had complained of weakness, general aching, headache, and feverishness. The signs of jaundice had also developed. There were marked anorexia and occasional vomiting. Owing to language difficulties the attending physician was not able to obtain the details of the history.

The past medical history was essentially negative.

Physical findings.—

General: Temperature 104.6°; pulse, 80; respiration, 24; blood pressure, 108/50. Anemic in appearance, weak, and poorly nourished.

Head: Eyes, ears, nose, and throat essentially negative.

Neck: There was tenderness over the anterior cervical glands.

Lungs: Clear.

Heart: No enlargement, rhythm regular, a faint systolic murmur was heard at apex and base.

Abdomen: Moderate tenderness in epigastrium just above the umbilicus. The liver and spleen were not felt.

Skin: More yellow than normal.

Extremities: Normal.

Reflexes: Normal.

Provisional diagnosis.—Typhoid, typhus, or undulant fever.

Laboratory findings.—

Urine: Free from albumin, casts, and sugar.

Blood: R. B. C. 3,800,000; W. B. C. 4,500; Hb. 70 per cent.

Agglutination tests on blood serum received at the State laboratory May 14, 1930, showed no reaction for typhoid fever, but *Br. melitensis* was agglutinated in dilutions to 1:320. On July 2, the agglutination titer was 1:1280.

A blood culture, consisting of 100 c. c. of fresh beef liver infusion broth containing 3–5 c. c. of the patient's blood, received by us May 23, was incubated under atmospheric conditions, subcultures being made May 27, May 31, and June 3, 1930, to beef liver infusion agar pH 6.6 in Petri plates in duplicate sets. One set was incubated under atmospheric conditions and the other under an atmosphere of 10 per cent carbon dioxide tension. Growth appeared June 10 on a plate incubated under atmospheric conditions and also on one under an atmosphere of 10 per cent carbon dioxide tension. The organisms on both plates were Gram negative, resembled *Brucella* morphologically, and were agglutinated by specific immune serum.

Several stool specimens cultured by the Amoss method (2) did not reveal organisms of the *Brucella* group.

Identification of strains.—In view of the patient's recent entrance from Mexico into the United States and his contact with goats, we had entertained the possibility of his suffering from a *Brucella* infection of the *melitensis* variety. For this reason one of us (I. H. B.) attended to the technical work involved.

When cultured according to Huddleson's dye method (3), the organism which grew under atmospheric conditions proved to be *Brucella melitensis*, variety *melitensis* (Lab. strain No. 89); that isolated under 10 per cent carbon dioxide tension, *Brucella melitensis*, variety *abortus* (Lab. strain No. 88).

These strains were forwarded to Dr. Edward Francis, of the National Institute of Health, at Washington, D. C., and to Dr. I. Forest Huddleson, Michigan State Agricultural College, East Lansing, Michigan. Both Francis (4) and Huddleson corroborated our findings. They used the agglutinin absorption and the dye test, respectively. From a second blood culture taken June 28, but one organism was isolated, namely, *Brucella melitensis*, variety *melitensis*.

Animal inoculations.—In order to determine the pathogenicity of the organisms isolated from the blood culture of this case, one-fourth

c. c. of a dilute suspension (1: 100 dilution of a suspension having a turbidity corresponding to 500 parts per million by the silica standard) was made from 72-hour cultures of laboratory strains Nos. 88 and 89 and inoculated into each of two guinea pigs. Prior to inoculation all of the guinea pig sera failed to agglutinate our standard *Brucella* antigen. After six weeks these pigs were again bled, the serum in each instance agglutinating *Br. abortus* antigen, in dilutions ranging from 1: 320 to 1: 5,120.

One of the pigs inoculated with Culture No. 89 was autopsied after eight weeks. The spleen was three times the normal size, contained several pin-head sized abscesses, and was bound down to the posterior wall by dense fibrous adhesions. The liver was somewhat enlarged, and diffusely studded with pin-point abscesses. Lymph glands in the groin and axilla, and of the mesenteric, iliac, and bronchial groups were enlarged to the size of a large navy bean. The glands were firm and on section contained thick creamy pus. The costo-sternal articulations were markedly arthrosed, being involved in a dense mass of fibrous tissue. The lungs contained many small pea-sized abscesses. The serum of blood taken at autopsy agglutinated *Brucella* antigen in dilutions through 1: 5,120. *Brucella melitensis*, variety *melitensis*, was isolated from all organs. The mate of this pig was posted with similar findings with the exception that the costo-sternal articulations were not involved and the serum titer was 1 : 2,560. It is interesting to note that these findings closely simulate the pathology found in guinea pigs experimentally inoculated with freshly isolated strains of the *suis* variety of *Br. melitensis*.

One of the pigs inoculated with Culture No. 88 showed several pin-point abscesses in the liver. The spleen was twice the normal size, and no abscesses could be demonstrated. There was no evidence of lymph gland involvement. The remaining organs were apparently normal. The blood serum agglutinated *Brucella* antigen through 1 : 640. *Br. melitensis*, variety *abortus*, was isolated from the spleen and liver. The mate of this pig presented identical findings.

It is quite evident from the pathological standpoint as well as from the agglutinin absorption tests as carried out by Francis and the dye method of Huddleson that we were dealing with two distinct varieties of organisms of the *Brucella* group.

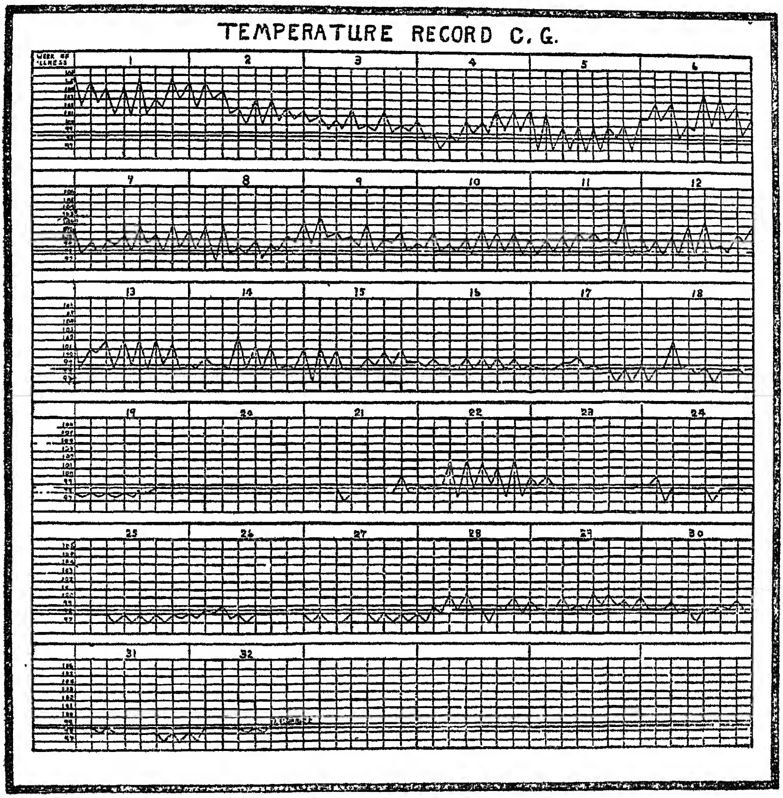
Epidemiological data.—On June 28 the patient was seen in the Santa Fe Hospital, an American woman who had lived for years among Mexicans ably assisting as interpreter. Remarks were at times incoherent, due to the feverish state.

The patient's home was in Juriria, Guanajuato, Mexico. He had made several trips to the United States from Mexico, between the years 1924 and 1930. While in Mexico, he did farm work, and had eight goats, which were usually milked by his mother and sisters.

He did not drink goat's milk, but ate cheese made from this milk. It was impossible to elicit accurate information relative to infectious abortion in animals.

The patient drank cow's milk at times. He had one cow which was sold to enable him to come to the United States.

He left Mexico in February, 1930, along with other Mexicans and a labor agent, going through Laredo to Fort Worth, from there to Kansas City, and finally to Sibley, Mo. He arrived at Sibley about



a month before admission to the hospital and about three weeks before the onset of his illness. While there, he had no contact with livestock, used only canned milk, and ate no butter—Mexicans, it was stated, eat lard instead of butter.

Course and treatment.—The patient's temperature (see temperature chart) was 106° on May 9, the day of admission. He continued to run a septic type of temperature, ranging from 98° to 99° in the morning to 101° and 103° every afternoon until September 1. Vaccine therapy was instituted July 2 and continued until July 9. The patient's condition improved slightly, but there was no appreciable

change in the temperature. On August 31, 0.1 gram acriflavine was given intravenously, and on September 1, 0.2 gram. The temperature became normal and remained so until September 6, when it again rose to 101.8°. On September 7, 0.4 gram of acriflavine was administered, following which the temperature again became normal and remained so several weeks.

The patient was "weak and emaciated" on September 24, but "gaining ground slowly". During the period October 1 to 8 another exacerbation of fever occurred, the temperature reaching 102° on the 5th and 6th, and then returning to normal. On November 12, patient was "gaining rapidly in weight and general appearance." He was granted a pass to Mexico and left the hospital December 17, 1930.

COMMENT

The following evidence indicates that the *melitensis* variety of *Br. melitensis* was in all likelihood acquired in Mexico.

(1) Undulant fever cases due to *Br. melitensis* occurred in Texas and were described in 1911 by Ferenbaugh (5) and by Gentry and Ferenbaugh (6). Cases occurring in Arizona were reported by Yount and Looney (7), those of 1922 by Watkins and Lake (8), and those in Southwestern United States by Lake (9). Goats were regarded as the source of infection.

A case of undulant fever with isolation of *Br. melitensis*, variety *melitensis*, from blood and urine was reported in 1918 by Woolsey (10). The patient was a Mexican and apparently developed the infection in Mexico.

(2) From 69 cases of undulant fever in Iowa in which blood cultures were positive, 71 organisms have been isolated. Forty-five strains were of variety *suis*, 25 of variety *abortus*, while the only *melitensis* variety is that isolated from the case here reported. Variety *melitensis* infection is not endemic in Iowa.

(3) *Br. melitensis* variety *melitensis* infection is known to be endemic in Mexico.

Letters were directed June 30, 1930, to health officers of Tampico, Mexico City, and Vera Cruz requesting information relative to the incidence of undulant fever and infectious abortion in goats and cows. Dr. E. Garcia, writing from Tampico, July 7, stated that no cases of undulant fever had been reported, but that infectious abortion occurred in goats and frequently in cows. Undulant fever cases were reported in the vicinity of Mexico City by Dr. E. Lando, officer in charge of the bureau of interchange.

Dr. Miguel E. Bustemante, director of the sanitary bureau of Vera Cruz, in a letter dated August 5, 1930, referred to undulant fever studies carried out in 1919–1920 by Dr. Ferando Ocaranza, director of the medical faculty at the National University of Mexico, and Dr. Gerar de Varela, bacteriologist of the Institute of Hygiene, Poptla

Tacuba. Doctor Bustemante stated that undulant fever cases were for the most part confined to the central plateau of Mexico, in the States of Pueblo, Mexico, Guanajuato, and San Luis Potosi.

SUMMARY

A Mexican laborer, aged 30, left his native country in February, 1930, took sick during April in Missouri, and was treated for undulant fever in a hospital in Iowa for 32 weeks. The blood culture yielded two strains of *Brucella melitensis*—variety *melitensis* and variety *abortus*. The *melitensis* variety of *Brucella* infection was in all likelihood acquired in Mexico because (1) with this one exception, all of the undulant fever cases in Iowa have, so far as known, been due to *Brucella melitensis*, variety *abortus* or variety *suis*, variety *melitensis* not being endemic in Iowa; (2) *Brucella melitensis*, variety *melitensis* infection is known to be endemic in Mexico; (3) the patient had contact with and used dairy products from goats in Mexico but not in the United States.

The source of the *abortus* variety of organism is not so clear. A double infection may have developed before the patient left Mexico, as he used milk in addition to caprine dairy products. On the other hand, it is possible that the bovine infection was superimposed after the patient's arrival in Iowa. Pasteurized milk was used, but several cases of undulant fever are known to have occurred in the same community, with dairy products as the probable source of infection, one other case occurring within the same period.

ACKNOWLEDGMENTS

We desire to acknowledge the collaboration of Dr. F. D. Ullrich, of Fort Madison, Iowa, who supervised the care of the patient, forwarded blood specimens, and made available the clinical and in part the epidemiological data relative to this case. We wish also to acknowledge the services rendered by Doctors Francis and Huddleson in corroborating our findings as to identification of the organisms isolated from the blood culture.

REFERENCES

(1) Hardy, A. V., Jordan, C. F., Borts, I. H., and Hardy, G. C.: Pub. Health Rep. **45**: 2525, (Oct. 17) 1930 (Appendix, Case 4 D, p. 2563). National Institute of Health Bulletin No. 158, page 80 (December), 1930.

(2) Amoss, H. L., and Poston, M. A.: Undulant (Malta) fever; Isolation of Brucella organisms from stools. J. A. M. A., **93**: 170–171 (July 20), 1929.

(3) Huddleson, I. Forest: The differentiation of the species of the genus Brucella. Technical Bulletin No. 100. Bacteriological Section, Michigan Agricultural Experiment Station 1929.

(4) Francis, Edward: Agglutinin absorption in undulant fever. Pub. Health Rep. **46**: 2416–2437 (Oct. 9), 1931.

(5) Ferenbaugh, Thomas L.: Endemic Mediterranean fever (Malta fever) in Southwest Texas. J. A. M. A., **57**: 730–731 (Aug. 26), 1911.

(6) Gentry, E. R., and Ferenbaugh, Thomas L.: Endemic Malta (Mediterranean) fever in Texas with isolation of Micrococcus melitensis from two patients. J. A. M. A., 57: 889–891 (Sept.), 1911.
(7) Yount, C. E., and Looney, R. N.: Malta fever, with preliminary report on cases occurring in Arizona. Arizona Medical Journal, 1: 18–26 (1913).
(8) Watkins, W. Warner, and Lake, G. C.: Malta fever, with special reference to the Phoenix, Arizona, epidemic of 1922. J. A. M. A., 89: 1581–1584 (Nov. 5), 1927.
(9) Lake, G. C.: Malta fever in Southwestern United States. Pub. Health Rep., 37: 2895–2899 (Nov. 24), 1922.
(10) Woolsey, Ross A.: Malta fever, with report of case. Missouri State Medical Association Journal, 15: 164–166 (May), 1918.

COURT DECISION RELATING TO PUBLIC HEALTH

Conviction for unlawful possession of plants known as "marajuana" upheld.—(Louisiana Supreme Court; State *v.* Bonoa, 136 So. 15; decided May 25, 1931.) Act 41 of 1924 provided in section 1 as follows:

> That no person shall possess, sell, dispose of, transport, deliver, in any form whatever in the State of Louisiana, the plant known as marajuana or any of its derivatives, either dried or in the form of cigarettes, tobacco, or any other way whatsoever.

Violation was made a misdemeanor, punishable by fine and imprisonment. The defendant was charged with unlawfully possessing plants known as marajuana, in that he had a number of the plants growing on his premises. These plants were growing in what was termed a second back yard immediately in the rear of the first. The two yards were separated by a shed through which one had to go to enter the second yard from the first. The defendant was convicted and appealed to the supreme court.

One of the defendant's contentions was that section 1 of the act involved was unconstitutional and void in so far as it attempted to prohibit the possession of plants termed "marajuana," as the section by so doing sought to prohibit the possession of something unknown. It was urged that there was no such plant known as marajuana and that hence the terminology used conveyed no conception of what was prohibited. Concerning this the supreme court stated that it did not find any difficulty in holding that the use of the word "marajuana" in connection with the word "plant" conveyed to the mind exactly what the legislature intended to convey, namely, the plant scientifically known as Cannabis indica or Cannabis americana. "Besides," said the court, "whatever doubt there may be as to what was meant by the use of the word is removed not only by the title of the act, where the plant is referred to as 'Cannabis indica, Cannabis america, or marajuana,' but also by section 4 of the act, where the plant is similarly designated, the name 'Cannabis indica' being well known scientifically."

Another ground urged by the defendant against the validity of section 1 was that, in so far as it prohibited the possession of the

marajuana plant in any form whatsoever, it was an infringement upon liberty and the rights to property in violation of the State and Federal constitutions. The court stated the defendant's views in this respect as follows:

The theory of the accused seems to be that, although the marajuana plant may be used in forms, such as cigarettes or tobacco, injurious to the public health, morals, and safety, yet it may be used for valuable purposes, such as the manufacture of hemp rope and twine, in the preparation of useful drugs, and for the production of seed which forms a large part of the rations of the millions of pet canary birds in this country, and that only in so far as the plant is sold, used, and possessed for deleterious purposes may such sale, use, or possession be prohibited without infringing, in violation of the State and Federal constitutions, upon the liberty of the people.

The court's holding with regard to this contention was adverse to the defendant, the view being taken that the legislature had not exceeded its powers by enacting section 1 of the act. In disposing of this point the court stated, in part, as follows:

One who has upon his premises to his knowledge a growing crop of Cannabis indica or Cannabis americana or marajuana, or any number of the plants growing thereon, possesses these plants within the meaning of section 1 of the statute. * * *

The act was passed under the police power of the State. In State v. McCormick (142 La. 580, 77 So. 288, 289, L. R. A. 1918C, 262) it was said: "'The legitimate exercise of the police power is not subject to restraint by constitutional provisions for the general protection of rights of individual life, liberty, and property.' State v. Schlemmer (42 La. Ann. 1166, 8 So. 307, 10 L. R. A. 135). And the fourteenth amendment to the Constitution of the United States does not interfere with the proper exercise of that power. (6 R. C. L. pars. 193, 194; L'Hote v. New Orleans, 177 U. S. 596, 20 S. Ct. 788, 44 L. Ed. 903.)"

The marajuana plant is a plant possessing properties deleterious to health and dangerous to the public safety and morals. * * * To permit the plant to be possessed in the State, even in its growing form, is virtually as unsafe as to permit its possession in the manufactured forms of cigarettes and tobacco, so readily and easily may it be converted into those forms.

The marajuana plant is not one of the crops of this State. While the plant may be put to valuable uses, nevertheless its deleterious properties may be fairly considered as outweighing those uses.

DEATHS DURING WEEK ENDED SEPTEMBER 19, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended September 19, 1931; and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Sept. 19, 1931	Corresponding week, 1930
Policies in force	74, 883, 159	75, 532, 011
Number of death claims	12, 059	13, 466
Death claims per 1,000 policies in force, annual rate	8. 4	9. 3
Death claims per 1,000 policies, first 38 weeks of year, annual rate	9. 9	9. 7

Deaths[1] from all causes in certain large cities of the United States during the week ended September 19, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended Sept. 19, 1931				Corresponding week, 1930		Death rate [2] for the first 38 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,453	10.9	732	[4] 57	10.3	728	12.2	12.1
Akron	30	6.1	5	49	7.1	3	7.9	7.9
Albany [5]	32	12.9	2	40	11.4	2	13.9	15.0
Atlanta	60	11.3	15	153	15.2	10	15.2	15.9
White	37		8	127		6		
Colored	23	([6])	7	201	([6])	4	([6])	([6])
Baltimore [5]	206	13.2	22	75	11.5	17	14.6	14.1
White	152		14	61		11		
Colored	54	([6])	8	125	([6])	6	([6])	([6])
Birmingham	53	10.3	1	10	11.2	7	13.8	13.9
White	29		1	17		3		
Colored	24	([6])	0	0	([6])	4	([6])	([6])
Boston	262	13.4	29	57	13.2	25	14.3	14.3
Bridgeport	34	12.1	1	17	7.8	0	11.3	11.2
Buffalo	129	11.6	20	82	11.3	19	13.3	13.1
Cambridge	17	7.8	0	0	11.0	3	12.3	11.8
Camden	25	11.0	1	17	10.5	3	14.5	13.7
Canton	16	7.8	2	46	6.4	4	10.3	10.1
Chicago [5]	622	9.5	54	48	9.9	52	10.9	10.5
Cincinnati	147	16.8	22	132	13.1	8	16.2	15.7
Cleveland	198	11.3	15	44	10.0	19	11.4	11.3
Columbus	79	13.9	4	39	13.4	5	13.9	15.8
Dallas	41	7.9	6		7.9	7	11.4	11.7
White	29		5			6		
Colored	12	([6])	1		([6])	1	([6])	([6])
Dayton	52	13.1	8	112	12.4	10	11.9	10.6
Denver	64	11.4	5	48	12.1	12	14.1	14.9
Des Moines	24	8.7	3	53	6.9	3	11.2	11.9
Detroit	229	7.2	32	51	8.5	44	8.4	9.5
Duluth	36	18.4	3	74	10.3	1	11.4	11.2
El Paso	24	11.9	4		10.1	7	16.2	17.7
Erie	24	10.6	1	19	12.6	2	10.8	11.4
Fall River [5,7]	21	9.5	3	68	11.3	0	11.4	12.1
Flint	21	6.7	8	102	7.6	5	7.1	9.3
Fort Worth	31	9.7	1		11.4	6	11.0	11.2
White	28		0			4		
Colored	3	([6])	1		([6])	2	([6])	([6])
Grand Rapids	28	8.5	4	59	10.5	3	9.2	10.4
Houston	83	14.0	7		12.5	10	11.3	12.2
White	55		5			2		
Colored	28	([6])	2		([6])	8	([6])	([6])
Indianapolis	98	13.8	5	41	11.7	10	14.1	14.8
White	79		4	38		10		
Colored	19	([6])	1	67	([6])	0	([6])	([6])
Jersey City	75	12.3	6	53	11.5	7	11.7	11.4
Kansas City, Kans	30	12.7	1	21	11.1	4	12.7	11.6
White	26		1	25		4		
Colored	4	([6])	0	0	([6])	0	([6])	([6])
Kansas City, Mo	97	12.4	6	46	10.3	6	13.3	13.4
Knoxville	27	12.9	7	149	11.3	4	12.5	14.0
White	22		7	167		3		
Colored	5	([6])	0	0	([6])	1	([6])	([6])
Long Beach	28	9.6	0	0	6.9	0	9.9	9.9
Los Angeles	252	10.0	15	44	10.5	24	10.8	11.1
Louisville	70	11.8	13	111	8.8	12	14.5	13.7
White	51		10	98		8		
Colored	19	([6])	3	190	([6])	4	([6])	([6])
Lowell [7]	18	9.3	1	25	7.8	2	12.7	13.5
Lynn	14	7.1	0	0	9.2	3	9.7	10.6
Memphis	102	20.6	8	85	10.9	5	16.8	17.6
White	42		7	117		1		
Colored	60	([6])	1	29	([6])	4	([6])	([6])
Miami	20	9.3	3	76	5.6	2	11.9	11.2
White	13		2	71		1		
Colored	7	([6])	1	88	([6])	1	([6])	([6])

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended September 19, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued

City	Week ended Sept. 19, 1931				Corresponding week, 1930		Death rate [2] for the first 38 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [4]	Deaths under 1 year	1931	1930
Milwaukee	97	8.6	14	61	8.9	14	9.5	9.7
Minneapolis	105	11.6	14	90	11.2	10	11.5	10.7
Nashville	57	19.1	13	194	9.1	6	17.1	16.7
White	39	-------	10	199	-------	5	-------	-------
Colored	18	(6)	3	177	(6)	1	(6)	(6)
New Bedford [7]	23	10.7	3	80	6.0	2	12.2	10.9
New Haven	31	9.9	0	0	12.2	2	12.6	13.1
New Orleans	130	14.5	14	77	13.6	10	17.2	17.5
White	78	-------	5	41	-------	4	-------	-------
Colored	52	(6)	9	147	(6)	6	(6)	(6)
New York	1,343	9.0	121	51	8.8	123	11.4	11.0
Bronx Borough	190	7.4	12	27	6.4	10	8.4	8.0
Brooklyn Borough	460	9.1	48	51	8.5	56	10.5	10.0
Manhattan Borough	508	14.6	41	70	12.6	42	17.3	16.3
Queens Borough	140	6.3	16	44	5.5	13	7.4	7.1
Richmond Borough	45	11.4	4	72	9.2	2	14.1	14.5
Newark, N. J.	91	11.0	11	58	10.4	6	11.8	12.2
Oakland	52	9.3	5	64	9.1	5	10.5	11.0
Oklahoma City	35	9.3	4	55	12.5	7	11.1	10.8
Omaha	52	12.5	3	31	13.6	2	14.1	13.8
Paterson	32	12.0	4	69	10.5	3	13.5	12.4
Peoria	18	8.7	3	79	14.8	2	12.7	12.6
Philadelphia	442	11.7	51	78	12.2	48	13.3	12.8
Pittsburgh	160	12.3	25	86	12.3	25	11.8	13.9
Portland, Oreg.	62	10.5	3	36	9.5	1	11.7	12.2
Providence	57	11.7	6	55	11.1	10	12.0	13.2
Richmond	54	15.3	6	37	13.4	5	15.8	15.1
White	32	-------	1	22	-------	2	-------	-------
Colored	22	(6)	5	217	(6)	3	(6)	(6)
Rochester	82	12.9	7	61	10.1	4	12.1	11.6
St. Louis	201	12.7	19	61	8.6	13	15.6	14.4
St. Paul	41	8.3	0	0	8.0	1	10.9	10.2
Salt Lake City [5]	35	12.8	2	30	10.4	5	12.3	12.5
San Antonio	52	11.3	12	-------	13.2	7	11.8	17.1
San Diego	41	13.7	3	61	12.2	1	13.7	11.5
San Francisco	146	11.7	6	40	11.9	7	13.2	13.1
Schenectady	13	7.0	0	0	13.1	0	10.6	11.4
Seattle	78	10.9	0	0	7.4	2	11.5	10.9
Somerville	15	7.4	0	0	8.5	0	9.1	9.9
South Bend	15	7.2	2	50	8.4	1	8.1	9.0
Spokane	19	8.5	1	26	9.9	0	12.4	12.1
Springfield, Mass.	21	8.2	5	77	10.7	2	11.9	12.2
Syracuse	45	11.3	3	36	9.2	4	11.8	11.7
Tacoma	[illegible]	12.6	0	0	8.3	1	13.1	12.6
Toledo	56	9.9	6	55	12.0	12	12.0	12.7
Trenton	37	15.6	2	35	13.5	1	16.8	16.8
Utica	20	10.2	2	52	11.3	1	14.1	15.0
Washington, D. C.	141	14.9	12	65	12.0	8	16.0	15.2
White	96	-------	8	65	-------	6	-------	-------
Colored	45	(6)	4	69	(6)	2	(6)	(6)
Waterbury	21	10.9	1	30	5.2	2	9.8	[illegible]
Wilmington, Del. [7]	36	17.6	5	108	13.7	3	11.9	11.1
Worcester	42	11.1	3	41	11.2	2	12.3	13.0
Yonkers	13	6.8	3	79	6.5	2	8.7	8.1
Youngstown	32	9.7	1	14	11.9	2	10.3	10.3

1 Deaths of nonresidents are included. Stillbirths are excluded.

2 These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

3 Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

4 Data for 77 cities.

5 Deaths for week ended Friday.

6 For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 28; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

7 Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended September 26, 1931, and September 27, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 26, 1931, and September 27, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930
New England States:								
Maine	5	1		1	15		1	0
New Hampshire	4	2			1		0	0
Vermont		1			1	1	0	0
Massachusetts	30	50	4		18	50	4	3
Rhode Island	1	6			6		0	0
Connecticut	3	7		3	5	4	2	1
Middle Atlantic States:								
New York	55	54	[1] 6	[1] 2	55	45	5	7
New Jersey	15	46		2	10	16	4	1
Pennsylvania	68	125			91	51	6	6
East North Central States:								
Ohio	80	63	10	11	28	21	1	9
Indiana	19	8	6	5	12	2	1	3
Illinois	63	102	266	3	85	20	11	5
Michigan	20	44			13	18	8	3
Wisconsin	10	11	10	34	8	21	0	1
West North Central States:								
Minnesota	10	13	2		2	1	0	0
Iowa	9	5			2	2	2	0
Missouri	55	27	1			13	0	4
North Dakota	2	1				8	4	3
South Dakota	1	8			1	9	0	1
Nebraska	14	5				1	0	0
Kansas	6	7			6	4	0	1
South Atlantic States:								
Delaware	2			1			0	0
Maryland [2] [3]	40	14	8	4	2	4	1	0
District of Columbia	11	15	2		1	3	1	0
West Virginia	28	21	12	1	5	13	0	0
North Carolina	129	118	1	14	4	10	0	3
South Carolina	28	38	113	160	7		0	0
Georgia [3]	56	21	6	15	2	5	0	0
Florida [3]	17	5		1		4	0	0
East South Central States:								
Kentucky	147				10		0	1
Tennessee	74	18	2	5		12	4	0
Alabama [3]	95	30	1	5	1	16	1	2
Mississippi	112	23					0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 10 cases: 1 case in Maryland; 3 cases in Georgia; 3 cases in Florida; 2 cases in Alabama; and 1 case in Texas.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 26, 1931, and September 27, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930
West South Central States:								
Arkansas	28	7	------	2	2	------	0	0
Louisiana	44	43	------	------	3	3	2	0
Oklahoma [4]	76	35	12	2	------	2	0	1
Texas [3]	22	15	2	2	------	------	0	0
Mountain States:								
Montana	2	------	------	------	3	2	0	0
Idaho	2	2	------	------	------	------	0	0
Wyoming	------	1	------	------	1	------	0	0
Colorado	10	10	------	------	6	7	0	2
New Mexico	2	3	------	------	1	------	0	0
Arizona	4	6	3	------	1	------	0	1
Utah [2]	------	------	5	------	------	2	1	2
Pacific States:								
Washington	7	3	------	------	8	4	0	2
Oregon	1	5	15	17	7	16	0	0
California	56	39	23	39	37	56	6	4

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 20, 1931	Week ended Sept. 27, 1930
New England States:								
Maine	7	21	6	12	0	0	4	9
New Hampshire	2	1	0	2	0	0	3	9
Vermont	4	0	3	3	0	0	0	1
Massachusetts	105	32	75	72	0	0	7	11
Rhode Island	8	2	9	3	0	0	1	1
Connecticut	81	5	2	14	0	0	5	2
Middle Atlantic States:								
New York	327	65	124	71	0	8	54	54
New Jersey	93	6	35	47	0	0	16	21
Pennsylvania	49	10	143	138	0	0	50	88
East North Central States:								
Ohio	14	100	130	184	1	19	183	75
Indiana	3	8	18	48	3	12	10	12
Illinois	62	43	110	142	11	12	53	43
Michigan	138	13	60	101	1	1	22	24
Wisconsin	70	20	21	41	4	6	8	5
West North Central States:								
Minnesota	62	17	30	32	3	4	19	7
Iowa	9	21	13	18	8	7	8	2
Missouri	0	18	21	30	5	8	18	30
North Dakota	2	2	10	11	1	1	5	4
South Dakota	1	4	1	4	1	1	5	1
Nebraska	1	26	4	12	0	10	1	7
Kansas	1	48	20	35	3	1	14	11
South Atlantic States:								
Delaware	0	0	1	4	0	0	1	3
Maryland [2] [3]	5	2	33	11	0	0	53	51
District of Columbia	2	0	9	3	0	0	3	2
West Virginia	3	3	24	19	0	7	68	53
North Carolina	5	5	75	96	0	1	41	40
South Carolina	0	2	18	21	2	0	49	35
Georgia [3]	4	1	25	16	0	0	33	35
Florida [3]	1	2	3	4	0	0	12	6
East South Central States:								
Kentucky	2	1	31	16	0	0	61	54
Tennessee	7	2	65	30	3	2	82	42
Alabama [3]	1	1	28	45	1	0	31	21
Mississippi	2	2	21	12	3	0	27	35

[2] Week ended Friday.

[3] Typhus fever, 1931, 10 cases: 1 case in Maryland; 3 cases in Georgia; 3 cases in Florida; 2 cases in Alabama; and 1 case in Texas.

[4] Exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended September 26, 1931, and September 27, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930	Week ended Sept. 26, 1931	Week ended Sept. 27, 1930
West South Central States:								
Arkansas	1	1	14	4	1	0	15	15
Louisiana	0	11	11	8	0	1	56	27
Oklahoma [4]	0	9	24	34	1	14	49	59
Texas [3]	0	8	30	11	1	4	20	7
Mountain States:								
Montana	5	0	9	15	2	0	10	15
Idaho	0	1	2	1	0	0	5	0
Wyoming	0	7	5	7	1	0	1	0
Colorado	0	4	11	9	1	0	7	11
New Mexico	2	2	2	8	0	0	5	20
Arizona	0	1	5	5	0	0	3	6
Utah [2]	1	2	3	3	0	0	2	2
Pacific States:								
Washington	4	3	42	31	6	12	4	5
Oregon	1	1	9	13	6	2	8	4
California	10	65	62	59	6	7	8	11

[2] Week ended Friday.
[3] Typhus fever, 1931, 10 cases: 1 case in Maryland; 3 cases in Georgia; 3 cases in Florida; 2 cases in Alabama; and 1 case in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August, 1931										
California	21	148	49	7	197	8	22	145	28	83
Florida		12	4	66	5	1	0	6	1	13
Idaho	1	9			6		1	18	1	8
Illinois	17	179	9	64	218	1	116	242	37	106
Louisiana	1	69	17	62	6	30	0	46	6	245
New York	37	233		13	793		2,638	393	6	187
Oklahoma [1]	4	97	67	262	4	89	3	40	15	199
Oregon		19	31	8	29		1	20	35	21
Pennsylvania	47	186		2	413	3	34	327	0	177
Porto Rico		29	59	3,424	18	1	3		0	12
Texas	1	80	23	947		9	8	77		123
Virginia	4	123	505	91	101	56	13	125	3	254
Washington	4	18	18		32		14	45	47	29

[1] Exclusive of Oklahoma City and Tulsa.

August, 1931	Cases
Anthrax:	
California	1
Illinois	1
New York	2
Pennsylvania	2
Chicken pox:	
California	129
Florida	3
Idaho	4
Illinois	66
Louisiana	5
New York	194
Chicken pox—Continued.	
Oklahoma [1]	9
Oregon	38
Pennsylvania	138
Porto Rico	1
Virginia	84
Washington	47
Diarrhea and dysentery:	
Virginia	1,091
Dysentery:	
California (amebic)	6
California (bacillary)	11
Florida	1

[1] Exclusive of Oklahoma City and Tulsa.

Disease and State	Cases
Dysentery—Continued.	
Illinois	134
Illinois (amebic)	4
Illinois (bacillary)	7
Louisiana	13
New York	21
Oklahoma [1]	41
Porto Rico	17
Filariasis:	
Porto Rico	3
Food poisoning:	
California	10
German measles:	
California	24
Illinois	9
New York	42
Pennsylvania	14
Washington	15
Granuloma, coccidioidal.	
California	1
Hookworm disease:	
California	2
Louisiana	11
Impetigo contagiosa:	
Oregon	5
Washington	3
Lead poisoning:	
Illinois	4
Leprosy:	
California	1
Louisiana	1
Porto Rico	2
Lethargic encephalitis:	
California	2
Louisiana	1
New York	12
Oregon	4
Pennsylvania	9
Washington	5
Mumps:	
California	149
Florida	6
Idaho	5
Illinois	127
Louisiana	12
New York	261
Oklahoma [1]	2
Oregon	27
Pennsylvania	380
Porto Rico	4
Washington	22
Ophthalmia neonatorum:	
California	2
Illinois	7
New York	3
Oklahoma [1]	1
Pennsylvania	13
Porto Rico	4
Paratyphoid fever:	
California	7
Illinois	9
Louisiana	3
New York	16
Oregon	1
Porto Rico	3
Paratyphoid fever—Continued.	
Texas	5
Washington	1
Puerperal septicemia:	
New York	13
Pennsylvania	22
Washington	1
Rabies in animals:	
California	36
Louisiana	4
New York [2]	3
Oregon	1
Relapsing fever:	
California	4
Rocky Mountain spotted or tick fever:	
Oregon	2
Scabies:	
Oklahoma [1]	1
Oregon	2
Septic sore throat:	
California	4
Illinois	3
Louisiana	1
New York	11
Oklahoma [1]	22
Oregon	3
Tetanus:	
Illinois	13
Louisiana	3
New York	11
Oklahoma [1]	2
Pennsylvania	6
Porto Rico	3
Tetanus, infantile:	
Porto Rico	5
Trachoma:	
California	7
Illinois	11
Oklahoma [1]	10
Porto Rico	2
Trichinosis:	
Illinois	1
New York	3
Pennsylvania	1
Tularaemia:	
California	1
Illinois	2
Louisiana	1
Virginia	2
Typhus fever:	
Florida	3
New York	2
Virginia	2
Undulant fever:	
California	4
Idaho	2
Illinois	8
Louisiana	3
New York	11
Oklahoma [1]	1
Oregon	2
Pennsylvania	3
Virginia	2
Washington	7

[1] Exclusive of Oklahoma City and Tulsa.

[2] Exclusive of New York City.

Vincent's angina:	Cases
New York [2]	76
Oklahoma [1]	4
Oregon	13
Whooping cough:	
California	704
Florida	5
Idaho	5
Illinois	1,067
Whooping cough—Continued.	Cases
Louisiana	18
New York	1,754
Oklahoma [1]	35
Oregon	43
Pennsylvania	1,479
Porto Rico	165
Virginia	518
Washington	164

[1] Exclusive of Oklahoma City and Tulsa.
[2] Exclusive of New York City.

Cases of certain communicable diseases reported for the month of March, 1931, by State health officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	216	12	214	262	143	0	47	4	176
New Hampshire [1]									
Vermont	68	4	25	145	43	0	19	0	96
Massachusetts	1,050	201	2,023	683	1,637	0	582	9	877
Rhode Island	93	26	52	128	266	0	55	0	38
Connecticut	392	33	3,065	327	277	0	147	2	396
New York	3,638	534	8,213	1,913	4,119	36	1,849	38	2,223
New Jersey	2,044	273	3,275	267	1,339		475	8	708
Pennsylvania	4,795	415	15,170	2,228	2,464	0	740	55	1,007
Ohio	2,452	190	3,591	1,803	2,285	256	661	21	440
Indiana	473	124	3,026	84	1,347	447	194	7	232
Illinois	1,563	518	7,163	1,497	2,415	169	1,079	15	657
Michigan	1,574	160	789	618	1,752	86	625	11	879
Wisconsin	1,845	55	1,887	3,382	654	24	120	5	497
Minnesota	783	89	455		501	30	210	5	238
Iowa	471	25	82	158	492	335	23	4	85
Missouri	448	208	1,853	168	1,591	213	[2] 254	31	107
North Dakota	154	19	156	117	106	35	21	4	60
South Dakota	201	43	330	11	94	112	17	6	41
Nebraska	390	42	30	602	226	224	20	2	79
Kansas	686	57	118	522	279	487	163	2	122
Delaware	21	11	388	101	101	0	18	1	9
Maryland	683	64	4,829	382	371	0	249	11	124
District of Columbia	204	61	950		127	0	82	1	35
Virginia	840	110	3,358		205	10	158	8	519
West Virginia	343	38	364		118	56	67	16	208
North Carolina	718	104	2,980		219	5		5	637
South Carolina	304	132	485	139	25	12	139	18	182
Georgia	186	29	546	178	337	3	130	27	131
Florida	290	35	702	35	26	6	44	11	60
Kentucky [3]									
Tennessee	443	57	1,651	159	561	73	229	28	169
Alabama	248	86	2,000	353	113	56	511	14	77
Mississippi	1,090	60	326	510	110	177	159	15	391
Arkansas	300	20	127	82	92	107	[2] 7	12	97
Louisiana	86	88	78	10	100	121	[2] 135	24	23
Oklahoma [4]	82	40	102	23	133	260	32	12	61
Texas		149			142			15	
Montana	126	14	43	196	106	19	64	6	173
Idaho	87	13	57	83	121	31	13	20	179
Wyoming	107	2	14	48	121	16	[2] 2	4	64
Colorado	378	42	1,453	275	219	22	54	2	283
New Mexico	113	20	289	95	43	16	78	3	32
Arizona	54	12	622	26	21	9	97	2	20
Utah [3]									
Nevada	20	1	263	7	1	0	[2] 9	0	2
Washington	575	35	219	246	221	165	59	13	260
Oregon	297	18	331	276	93	112	45	8	50
California	2,509	222	5,969	1,492	620	216	962	33	1,211

[1] Report not received.
[2] Pulmonary.
[3] Reports received weekly.
[4] Exclusive of Oklahoma City and Tulsa.

Case rates per 100,000 population (annual basis) for the month of March, 1931

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	318	18	315	385	210	0	69	6	259
New Hampshire [1]									
Vermont	222	13	82	474	140	0	62	0	314
Massachusetts	288	55	554	187	448	0	159	2	240
Rhode Island	157	44	88	216	449	0	93	0	64
Connecticut	282	24	2,208	236	200	0	106	1	285
New York	278	49	752	175	377	3	169	3	201
New Jersey	580	77	929	76	380		135	2	204
Pennsylvania	579	50	1,833	209	298	0	89	7	122
Ohio	427	35	626	314	308	45	115	4	77
Indiana	170	45	1,088	30	484	161	70	3	83
Illinois	237	78	1,085	227	366	26	163	2	100
Michigan	372	38	186	146	414	20	148	3	208
Wisconsin	730	22	746	1,338	259	9	47	2	197
Minnesota	357	41	207		228	14	96	2	108
Iowa	224	12	39	75	234	159	11	2	40
Missouri	144	67	597	54	512	69	[2] 82	10	31
North Dakota	265	33	268	201	182	60	36	7	103
South Dakota	338	72	555	19	158	188	29	10	69
Nebraska	331	36	25	511	192	190	17	2	67
Kansas	426	35	73	324	173	303	101	1	76
Delaware	103	54	1,901	405	495	0	88	5	44
Maryland	486	46	3,438	272	264	0	177	8	88
District of Columbia	487	146	2,209		303	0	196	2	84
Virginia	406	53	1,623		99	5	76	4	251
West Virginia	220	25	243		79	37	45	11	130
North Carolina	261	38	1,081		79	2		2	231
South Carolina	205	80	327	94	17	8	94	12	123
Georgia	75	12	221	72	136	1	53	11	53
Florida	223	27	541	27	20	5	34	8	46
Kentucky [3]									
Tennessee	197	25	733	71	249	32	102	12	75
Alabama	109	38	878	155	50	25	224	6	34
Mississippi	630	35	188	295	64	102	92	9	226
Arkansas	189	13	80	52	58	67	[2] 4	8	61
Louisiana	47	48	43	6	55	67	[2] 74	13	13
Oklahoma [4]	46	22	57	13	75	146	18	7	34
Texas		29			28			3	
Montana	276	31	94	429	232	42	140	13	379
Idaho	229	34	150	210	319	82	34	53	472
Wyoming	549	10	72	246	621	82	[2] 10	21	329
Colorado	425	47	1,033	300	246	25	61	2	318
New Mexico	309	55	790	260	117	44	213	8	87
Arizona	142	32	1,035	68	55	24	255	5	53
Utah [3]									
Nevada	254	13	3,340	89	13	0	[2] 114	0	25
Washington	426	26	102	182	164	122	44	10	193
Oregon	359	22	400	333	112	135	54	10	60
California	496	44	1,181	295	123	43	190	7	240

[1] Report not received.
[2] Pulmonary.
[3] Reports received weekly.
[4] Exclusive of Oklahoma City and Tulsa.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of August, 1931, by departments of health of certain States to other State health departments

Disease	California	Connecticut	Illinois	Maine	Minnesota	Missouri	New Jersey	New York
Diphtheria		2						
Gonorrhea								
Malaria	1							
Pneumonia	1							
Poliomyelitis		2		1	2	1	1	3
Scarlet fever					1			2
Trachoma					1			
Tuberculosis			16		32			
Typhoid fever					1		2	5

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,240,000. The estimated population of the 90 cities reporting deaths is more than 31,695,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended September 19, 1931, and September 20, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,149	804	
97 cities	217	291	468
Measles:			
45 States	490	463	
97 cities	142	101	
Meningococcus meningitis:			
43 States	68	67	
97 cities	41	28	
Poliomyelitis:			
43 States	1,268	503	
Scarlet fever:			
46 States	1,226	1,030	
97 cities	366	381	332
Smallpox:			
46 States	69	128	
97 cities	4	28	7
Typhoid fever:			
46 States	1,037	940	
97 cities	267	137	157
Deaths reported			
Influenza and pneumonia:			
90 cities	377	353	
Smallpox:			
90 cities	0	0	

City reports for week ended September 19, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	0		0	0	0	1
New Hampshire:								
Concord	0	0	0		0	0	0	0
Manchester	0	0	0		0	0	0	0
Nashua	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	0	0		0	0	0	0
Massachusetts:								
Boston	10	14	10	4	0	3	0	8
Fall River	1	2	0	1	0	1	0	1
Springfield	0	1	0		0	0	1	3
Worcester	1	3	1	1	0	0	17	2
Rhode Island:								
Pawtucket	0	1	2	0	0	1	0	0
Providence	0	3	1		0	7	1	1
Connecticut:								
Bridgeport	1	2	1	1	1	0	0	3
Hartford	0	1	0		0	0	1	2
New Haven	0	0	0		0	1	0	0

City reports for week ended September 19, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
MIDDLE ATLANTIC								
New York:								
Buffalo	0	7	2		0	1	1	7
New York	12	74	33	8	3	16	13	86
Rochester	2	2	0		0	3	8	1
Syracuse	1	1	0		0	1	0	1
New Jersey:								
Camden	0	2	0		0	0	0	2
Newark	1	8	3		0	4	0	7
Trenton	0	1	0		1	2	0	1
Pennsylvania:								
Philadelphia	11	27	3	2	1	5	3	21
Pittsburgh	4	11	8	6	1	9	0	19
Reading	0	1	0		0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	2	5	5		0	0	1	4
Cleveland	12	22	0	2	0	10	28	12
Columbus	0	2	4	1	1	0	1	4
Toledo	2	4	0		0	1	0	4
Indiana:								
Fort Wayne	0	1	1		0	0	0	2
Indianapolis	1	4	1		0	2	8	1
South Bend	0	0	0		0	0	0	2
Terre Haute	1	1	0		0	0	0	1
Illinois:								
Chicago	22	56	27	2	3	8	7	20
Springfield	2	0	0		0	0	3	1
Michigan:								
Detroit	8	29	7		1	1	2	14
Flint	0	2	1		0	0	0	2
Grand Rapids	1	0	0		0	3	0	0
Wisconsin:								
Kenosha	0	0	0		0	0	13	0
Madison	0	1	0		0	0	3	0
Milwaukee	12	5	2		0	4	12	5
Racine	3	0	0		0	0	9	0
Superior	0	1	0		0	0	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	0	0	0		0	0	1	2
Minneapolis	7	14	2		2	2	23	4
St. Paul	5	7	1		0	2	2	0
Iowa:								
Davenport	3	0	0			0	0	
Des Moines	0	0	1			0	0	
Sioux City	0	1	0			0	1	
Waterloo	0	0	1			0	0	
Missouri:								
Kansas City	0	2	2		0	1	0	2
St. Joseph	1	0	1		0	0	0	3
St. Louis	2	17	8			1	1	3
North Dakota:								
Fargo	1	0	0		0	0	1	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	12	0	0			0	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	0	5	2		0	0	0	1
Kansas:								
Topeka	0	1	1	1	0	0	1	0
Wichita	2	1	4		0	1	1	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	0	0	0
Maryland:								
Baltimore	12	15	8	3	0	3	4	10
Cumberland	0	1	0		0	0	0	1
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	0	9	9	1	1	0	0	0
Virginia:								
Lynchburg	0	2	1		0	2	0	0
Norfolk	0	1	1		0	0	0	2
Richmond	0	12	5		1	0	0	2
Roanoke	0	3	6		0	0	0	1

City reports for week ended September 19, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
SOUTH ATLANTIC—con.								
West Virginia:								
Charleston	0	0	0		0	1	0	0
Wheeling	0	1	0		0	0	0	0
North Carolina:								
Raleigh	1	2	1		0	0	0	0
Wilmington	0	0	0		0	0	0	0
Winston-Salem	1	2	3		0	0	0	0
South Carolina:								
Charleston	0	1	0	3	0	0	0	2
Columbia	0	1	1		0	0	0	1
Greenville	0	1	0		0	0	0	0
Georgia:								
Atlanta	1	5	3		0	1	1	4
Brunswick	0	0	0		0	0	0	0
Savannah	0	1	0	4	0	0	0	2
Florida:								
Miami	0	2	1		0	1	0	1
Tampa	0	1	0		0	0	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	0	0	0
Tennessee:								
Memphis	1	3	7		0	0	0	1
Nashville	0	2	4		0	0	0	6
Alabama:								
Birmingham	0	3	0		0	0	0	2
Mobile	0	1	3		0	0	0	0
Montgomery	0	2	2			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	2			1	0	
Little Rock	0	0	1		0	1	0	5
Louisiana:								
New Orleans	1	8	1	1	0	0	0	8
Shreveport	0	1	0		0	3	0	0
Oklahoma:								
Muskogee	0	0	3		0	0	0	0
Texas:								
Dallas	0	6	2		0	0	0	1
Fort Worth	1	1	1		0	0	0	1
Galveston	0	0	0		0	0	0	2
Houston	0	5	7		0	0	0	4
San Antonio		2						
MOUNTAIN								
Montana:								
Billings	0	0	0		0	7	0	0
Great Falls	1	0	0		0	0	0	1
Helena	0	0	0		0	5	0	0
Missoula	0	0	0		0	0	0	1
Idaho:								
Boise	1	0	0		0	0	1	1
Colorado:								
Denver	2	8	1		0	2	2	5
Pueblo	1	0	0		0	0	4	0
New Mexico:								
Albuquerque	0	0	0		0	0	0	0
Arizona:								
Phoenix	0	0	0		0	0	0	1
Utah:								
Salt Lake City	0	2	1		0	0	2	1
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	7	3	0			0	1	
Spokane	1	1	0			0	0	
Tacoma	1	2	4		0	0	0	2
Oregon:								
Portland	1	5	2		0	4	5	2
Salem	0	0	0		0	0	1	0
California:								
Los Angeles	2	18	7	19	1	4	4	24
Sacramento	1	1	4		0	3	1	3
San Francisco	9	8	0	1	0	20	3	6

City reports for week ended September 19, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	1	0	0	0	0	0	0	2	0	5	22
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	7
Manchester	1	0	0	0	0	0	0	0	0	0	16
Nashua	0	0	0	0	0	0	0	0	0	0	....
Vermont:											
Barre	0	1	0	0	0	1	0	0	0	0	1
Burlington	0	0	0	3	0	0	0	0	0	1	7
Massachusetts:											
Boston	16	16	0	0	0	9	3	3	1	24	202
Fall River	1	4	0	0	0	0	0	0	0	1	21
Springfield	1	0	0	0	0	0	0	0	0	1	19
Worcester	3	6	0	0	0	2	1	1	0	13	42
Rhode Island.											
Pawtucket	0	0	0	0	0	1	0	0	0	0	12
Providence	2	7	0	0	0	1	2	0	0	5	57
Connecticut:											
Bridgeport	2	1	0	0	0	1	0	0	0	1	34
Hartford	1	1	0	0	0	1	0	1	0	5	36
New Haven	1	0	0	0	0	2	2	2	0	2	31
MIDDLE ATLANTIC											
New York:											
Buffalo	6	6	0	0	0	9	1	1	0	21	125
New York	27	22	0	0	0	83	37	25	6	166	1,343
Rochester	2	13	0	0	0	0	1	0	0	6	76
Syracuse	2	7	0	0	0	1	0	0	0	24	46
New Jersey:											
Camden	0	0	0	0	0	0	1	3	0	3	25
Newark	3	6	0	0	0	7	1	0	0	81	100
Trenton	1	2	0	0	0	3	1	0	0	1	37
Pennsylvania:											
Philadelphia	19	28	0	0	0	35	10	1	0	109	442
Pittsburgh	11	12	0	0	0	8	3	5	0	24	160
Reading	0	0	0	0	0	0	1	0	0	0	19
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	6	17	0	1	0	4	2	1	0	10	147
Cleveland	13	10	0	0	0	12	4	130	7	102	198
Columbus	3	2	0	0	0	5	1	0	0	7	79
Toledo	4	5	1	1	0	6	2	0	0	19	56
Indiana:											
Fort Wayne	1	0	0	0	0	0	1	1	0	5	23
Indianapolis	3	5	0	0	0	7	1	0	0	8	....
South Bend	1	1	0	0	0	1	1	0	0	0	15
Terre Haute	1	0	0	0	0	0	0	0	0	0	18
Illinois:											
Chicago	33	40	0	0	0	46	6	6	0	182	632
Springfield	0	2	0	0	0	0	1	0	0	0	15
Michigan:											
Detroit	27	9	0	0	0	25	4	8	1	147	220
Flint	6	3	0	1	0	0	0	1	0	6	21
Grand Rapids	5	3	0	0	0	2	0	0	0	8	28
Wisconsin:											
Kenosha	0	1	0	0	0	0	0	2	0	5	4
Madison	1	0	0	0	....	....	0	0	....	0	....
Milwaukee	8	4	0	0	0	6	1	0	0	49	97
Racine	2	3	0	0	0	0	0	0	0	4	9
Superior	1	2	0	0	0	1	0	0	0	0	6

City reports for week ended September 19, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	6	0	0	0	2	0	8	0	0	36
Minneapolis	16	6	0	0	0	0	1	2	0	8	105
St. Paul	8	0	0	0	0	1	1	0	0	7	49
Iowa:											
Davenport	0	0	0	0	--------	--------	0	0	--------	3	--------
Des Moines	2	1	0	2	--------	--------	0	1	--------	0	24
Sioux City	0	1	0	0	--------	--------	0	1	--------	2	--------
Waterloo	1	0	0	0	--------	--------	0	0	--------	1	--------
Missouri:											
Kansas City	4	0	0	0	0	6	2	0	0	3	97
St. Joseph	0	0	0	0	0	0	0	0	0	0	30
St. Louis	12	13	0	0	0	13	6	7	0	51	200
North Dakota:											
Fargo	2	0	0	0	0	0	0	0	0	1	--------
Grand Forks	0	0	0	0	--------	--------	0	0	--------	0	--------
South Dakota:											
Aberdeen	0	0	0	0	--------	--------	0	0	--------	7	--------
Sioux Falls	0	0	0	0	--------	--------	0	0	--------	0	11
Nebraska:											
Omaha	1	0	0	0	0	2	1	0	0	0	52
Kansas:											
Topeka	1	1	0	0	0	0	2	0	0	0	10
Wichita	2	4	0	0	0	1	0	2	0	0	34
SOUTH ATLANTIC											
Delaware:											
Wilmington	0	1	0	0	0	0	0	0	0	2	36
Maryland:											
Baltimore	6	10	0	0	0	11	8	5	2	125	206
Cumberland	0	1	0	0	0	1	1	0	1	0	13
Frederick	0	0	0	0	0	0	0	0	0	0	--------
District of Columbia:											
Washington	6	4	0	0	0	11	3	2	2	25	141
Virginia:											
Lynchburg	0	2	0	0	0	2	1	0	0	0	15
Norfolk	1	3	0	0	0	4	1	3	0	11	--------
Richmond	4	8	0	0	0	0	2	0	1	2	45
Roanoke	1	0	0	0	0	1	1	0	0	2	18
West Virginia:											
Charleston	1	0	0	0	0	0	2	0	0	3	26
Wheeling	1	0	0	0	0	0	2	0	0	0	15
North Carolina:											
Raleigh	0	2	0	0	0	1	0	0	0	12	9
Wilmington	0	0	0	0	0	1	0	0	0	3	18
Winston-Salem	2	1	1	0	0	1	1	0	0	12	15
South Carolina:											
Charleston	0	4	0	0	0	3	2	1	1	0	22
Columbia	0	2	0	0	0	3	0	2	0	0	22
Greenville	0	0	0	0	0	0	0	0	0	0	--------
Georgia:											
Atlanta	5	1	0	0	0	3	3	2	0	1	60
Brunswick	0	0	0	0	0	0	0	1	0	0	5
Savannah	0	0	0	0	0	1	0	0	0	1	28
Florida:											
Miami	0	0	0	0	0	0	1	2	0	0	20
Tampa	1	0	0	0	0	2	0	0	1	0	26

City reports for week ended September 19, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	1	0	0	0	0	1	0	0	0	17
Tennessee:											
Memphis	2	3	0	0	0	11	5	3	0	11	102
Nashville	2	1	0	0	0	5	5	0	0	7	57
Alabama:											
Birmingham	4	4	0	0	0	5	4	4	0	4	53
Mobile	0	2	0	0	0	1	0	0	0	0	19
Montgomery	0	3	0	0			0	1		6	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0			0	0		0	
Little Rock	1	0	0	0	0	1	1	0	0	0	6
Louisiana:											
New Orleans	2	3	0	0	0	10	4	9	0	0	130
Shreveport	1	1	0	0	0	1	0	2	1	6	26
Oklahoma:											
Muskogee	0	0	0	0	0	0	0	1	0	0	
Texas:											
Dallas	2	6	1	0	0	4	2	0	0	10	41
Fort Worth	2	4	0	0	0	2	1	1	0	0	31
Galveston	0	0	0	0	0	0	0	0	0	0	11
Houston	1	3	0	0	0	5	1	1	1	0	83
San Antonio	1		0				0				
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	1	12
Great Falls	0	0	1	0	0	0	0	0	0	0	7
Helena	0	0	0	0	0	0	0	0	0	1	7
Missoula	0	1	0	0	0	2	0	0	1	0	8
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	1	5
Colorado:											
Denver	4	9	0	0	0	8	2	0	0	7	64
Pueblo	0	0	0	0	0	0	1	2	0	0	12
New Mexico:											
Albuquerque	0	0	0	0	0	3	1	1	0	0	7
Arizona:											
Phoenix	1	0	0	0	0	1	0	0	0	0	
Utah:											
Salt Lake City	1	0	0	0	0	2	2	1	0	1	35
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	6
PACIFIC											
Washington:											
Seattle	5	8	1	0			1	1		12	
Spokane	2	0	1	0			1	0		0	
Tacoma	1	1	1	0	0	0	0	0	0	3	26
Oregon:											
Portland	3	0	2	1	0	4	2	0	0	0	62
Salem	0	0	0	0	0	0	0	0	0	0	
California:											
Los Angeles	9	16	1	0	0	18	2	3	1	10	252
Sacramento	1	0	0	0	0	2	0	2	0	3	30
San Francisco	6	3	0	2	0	9	0	12	1	5	

City reports for week ended September 19, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	2	1
New Hampshire:									
Concord	0	0	0	0	0	0	0	1	0
Manchester	0	0	0	0	0	0	0	1	0
Nashua	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	0	0	0	0	0	0	4	34	4
Fall River	6	1	0	0	0	0	0	6	1
Springfield	0	0	0	0	0	0	0	10	0
Worcester	0	0	0	0	0	0	1	3	1
Rhode Island:									
Pawtucket	0	0	0	0	0	0	0	2	0
Providence	0	0	0	0	0	0	1	2	1
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	8	0
Hartford	0	0	0	0	0	0	0	8	2
New Haven	0	0	0	0	0	0	1	8	0
MIDDLE ATLANTIC									
New York:									
New York	13	1	4	1	0	0	14	226	38
Rochester	0	0	0	0	0	0	1	2	0
Syracuse	0	0	0	0	0	0	2	0	1
New Jersey:									
Newark	0	0	1	0	0	0	0	6	1
Trenton	0	0	0	0	0	0	0	0	1
Pennsylvania:									
Philadelphia	0	1	0	0	0	0	1	9	1
Pittsburgh	3	2	2	1	0	0	0	2	0
EAST NORTH CENTRAL									
Ohio:									
Cleveland	1	0	0	0	0	1	3	5	0
Toledo	1	0	0	0	0	0	0	1	0
Indiana:									
Indianapolis	0	1	0	0	0	0	1	0	0
Illinois:									
Chicago	3	1	1	0	1	1	4	6	1
Springfield	1	0	0	0	0	0	0	1	0
Michigan:									
Detroit	3	0	2	1	0	0	3	44	2
Grand Rapids	0	0	0	0	0	0	0	1	1
Wisconsin:									
Kenosha	0	0	0	0	0	0	0	1	0
Madison	0	0	0	0	0	0	1	4	0
Milwaukee	0	0	0	0	0	0	1	5	0
Racine	0	0	0	0	0	0	0	1	0
Superior	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	9	0
Minneapolis	0	0	1	0	0	0	1	15	1
St. Paul	0	0	0	0	0	0	1	34	2
Iowa:									
Des Moines	0	0	0	0	0	0	1	2	0
Missouri:									
Kansas City	0	0	0	0	0	0	1	1	1
St. Louis	3	0	0	0	0	0	0	1	1
North Dakota:									
Grand Forks	0	0	0	0	0	0	0	1	0
Nebraska:									
Omaha	2	0	0	0	0	0	0	1	0

City reports for week ended September 19, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
SOUTH ATLANTIC [1]									
Maryland:									
Baltimore	0	0	0	0	0	0	1	2	0
Cumberland	1	0	0	0	0	0	0	0	0
Virginia:									
Lynchburg	0	0	0	0	0	1	0	0	0
Richmond	0	0	0	0	0	0	0	1	0
North Carolina:									
Raleigh	0	0	0	0	0	0	0	1	0
South Carolina:									
Charleston	0	0	0	0	6	0	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Georgia:									
Atlanta [1]	0	0	0	0	0	0	0	1	1
Brunswick	0	0	0	0	1	0	0	0	0
Savannah [1]	1	0	0	0	0	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	0	0	0	0	1	0	5	1
Nashville	1	0	0	0	0	0	0	1	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	1	1	1	0	0	2	0
Texas: [1]									
Dallas	0	0	0	0	1	1	0	0	0
Houston	0	0	0	0	0	1	0	0	0
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	0	1	0
Missoula	0	0	0	0	0	0	0	1	1
New Mexico:									
Albuquerque	0	0	0	0	0	0	0	1	1
Utah:									
Salt Lake	1	0	0	0	0	0	1	0	0
Nevada:									
Reno	0	0	0	0	0	0	1	1	0
PACIFIC									
Washington:									
Seattle	0	0	0	0	0	0	0	2	0
Tacoma	0	0	0	0	0	0	0	2	1
Oregon:									
Portland	0	0	0	0	0	0	1	1	1
California:									
Los Angeles	0	1	0	0	1	1	2	1	0
San Francisco	1	1	0	0	1	0	0	1	1

[1] Typhus fever, 6 cases: 1 case at Atlanta, Ga.; 2 cases at Savannah, Ga.; 2 cases at Miami, Fla.; and 1 case at Fort Worth, Tex.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended September 19, 1931, compared with those for a like period ended September 20, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, August 16 to September 19, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Aug. 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930
98 cities	[2] 30	33	[2] 31	38	[3] 37	40	35	44	[4] 34	46
New England	67	41	41	53	55	39	58	60	30	34
Middle Atlantic	19	27	18	29	24	29	26	26	22	38
East North Central	[2] 28	40	[2] 33	45	38	48	32	63	29	74
West North Central	31	25	36	27	[5] 26	35	34	56	42	48
South Atlantic	24	40	63	64	31	66	45	68	73	46
East South Central	35	12	52	12	81	48	99	24	93	24
West South Central	68	63	34	66	[6] 107	56	41	45	[4] 52	63
Mountain	41	44	17	70	52	44	26	35	17	26
Pacific	35	22	24	16	27	32	29	22	29	12

MEASLES CASE RATES

98 cities	[2] 20	28	[2] 22	20	[3] 10	24	14	16	[4] 22	16
New England	63	65	63	22	58	36	29	41	31	10
Middle Atlantic	25	31	13	22	14	27	8	10	18	16
East North Central	[2] 37	21	[2] 23	7	11	12	13	9	17	14
West North Central	13	19	8	27	[5] 9	31	11	15	13	19
South Atlantic	20	20	4	32	8	28	6	6	14	22
East South Central	23	6	6	12	6	24	6	6	0	0
West South Central	7	0	24	10	[6] 0	0	10	3	[4] 20	0
Mountain	70	26	52	35	52	53	35	35	122	44
Pacific	22	40	53	30	67	34	45	16	53	18

SCARLET FEVER CASE RATES

98 cities	[2] 43	32	[2] 41	41	[3] 48	42	49	50	[4] 57	61
New England	90	51	46	56	87	60	106	56	87	77
Middle Atlantic	38	25	30	26	37	24	30	26	43	45
East North Central	[2] 57	35	[2] 43	47	56	47	64	84	62	90
West North Central	19	35	31	43	[5] 30	58	36	35	59	45
South Atlantic	36	30	30	72	51	72	55	56	71	44
East South Central	17	30	70	102	87	60	64	36	81	36
West South Central	27	35	64	14	[6] 55	63	41	24	[4] 52	52
Mountain	44	88	165	88	26	35	61	79	87	70
Pacific	31	28	39	26	43	28	39	63	55	67

SMALLPOX CASE RATES

98 cities	[2] 1	2	[2] 1	2	[3] 1	3	1	3	[4] 1	4
New England	0	0	0	0	0	0	2	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	[2] 0	0	[2] 0	0	4	2	2	2	1	9
West North Central	6	8	4	8	[5] 4	14	6	27	0	21
South Atlantic	4	2	4	0	0	4	0	0	0	0
East South Central	0	0	0	0	0	0	6	0	0	0
West South Central	0	7	0	3	[6] 0	0	0	0	0	0
Mountain	0	0	0	0	0	0	0	0	[4] 0	0
Pacific	4	10	4	10	2	12	0	8	4	4

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Terre Haute, Ind., not included.
[3] St. Paul, Minn., and Fort Smith, Ark., not included.
[4] San Antonio, Tex., not included.
[5] St. Paul, Minn., not included.
[6] Fort Smith, Ark., not included.

Summary of weekly reports from cities, August 16 to September 19, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Aug. 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930
98 cities	[2] 21	19	[2] 22	24	[3] 20	21	23	26	[4] 42	22
New England	5	17	22	12	7	12	7	22	22	12
Middle Atlantic	14	13	20	20	13	20	13	24	16	15
East North Central	[2] 11	9	[2] 10	10	16	12	10	17	91	11
West North Central	19	21	13	19	[5] 6	14	13	21	38	29
South Atlantic	55	60	38	88	49	58	79	70	26	68
East South Central	70	78	47	42	41	48	35	48	47	48
West South Central	91	24	98	66	[6] 76	45	91	52	[4] 48	63
Mountain	9	26	9	44	44	9	35	62	26	0
Pacific	8	6	12	8	10	8	27	4	35	14

INFLUENZA DEATH RATES

	Aug. 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930
91 cities	[2] 2	3	[2] 2	4	[5] 2	3	4	3	[4] 3	3
New England	2	0	0	0	2	0	2	0	2	2
Middle Atlantic	2	3	2	3	1	3	4	4	3	2
East North Central	[2] 2	1	[2] 1	4	1	2	3	3	3	2
West North Central	3	0	3	3	[5] 3	6	0	0	0	0
South Atlantic	6	8	6	8	2	8	2	2	4	0
East South Central	0	0	13	6	6	0	0	10	0	26
West South Central	0	4	0	7	10	11	17	0	[4] 0	7
Mountain	0	9	0	0	0	9	0	0	0	18
Pacific	7	7	2	2	2	0	2	0	2	0

PNEUMONIA DEATH RATES

	Aug. 22, 1931	Aug. 23, 1930	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930
91 cities	[2] 48	45	[2] 48	52	[5] 50	53	55	54	[4] 59	57
New England	36	56	46	51	24	56	58	68	50	56
Middle Atlantic	56	53	60	57	62	65	65	63	66	65
East North Central	[2] 32	27	[2] 26	50	33	36	36	43	45	42
West North Central	44	36	50	39	[5] 73	51	44	45	44	75
South Atlantic	63	52	69	60	61	68	63	58	57	56
East South Central	57	65	57	45	38	91	82	20	57	71
West South Central	59	57	59	36	83	50	73	57	[4] 82	46
Mountain	44	53	61	53	96	53	70	123	78	115
Pacific	53	40	20	45	19	27	46	25	81	40

[2] Terre Haute, Ind., not included.
[3] St. Paul, Minn., and Fort Smith, Ark., not included.
[4] San Antonio, Tex., not included.
[5] St. Paul, Minn., not included.
[6] Fort Smith, Ark., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended September 12, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended September 12, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia [2]		3			
New Brunswick					1
Quebec			75		32
Ontario	1	2	18	2	32
Manitoba			2		13
Saskatchewan	1			12	2
Alberta			3		2
British Columbia	1		2		2
Total	3	5	100	14	86

[1] No case of any disease included in the table was reported during the week.
[2] Two cases of undulant fever.

Quebec Province—Communicable diseases—Week ended September 12, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended September 12, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	3	Mumps	2
Diphtheria	31	Poliomyelitis	75
Erysipelas	5	Scarlet fever	26
German measles	1	Tuberculosis	36
Itch	1	Typhoid fever	32
Measles	15	Whooping cough	35

CUBA

Habana—Communicable diseases—Four weeks ended September 12, 1931.—During the four weeks ended September 12, 1931, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	1		Measles	38	3
Diphtheria	6	1	Scarlet fever	1	
Leprosy	2		Tuberculosis	26	4
Malaria	[1] 5	3	Typhoid fever	[1] 8	2

[1] Many of these cases are from the island of Cuba, outside of Habana.

CZECHOSLOVAKIA

Communicable diseases—June, 1931.—During the month of June, 1931, certain communicable diseases were reported in the Republic of Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	16		Puerperal fever	27	11
Cerebrospinal meningitis	10	3	Scarlet fever	1,134	21
Diphtheria	1,156	64	Trachoma	209	
Dysentery	19	2	Typhoid fever	326	25
Malaria	125		Typhus fever	2	
Paratyphoid fever	16	1			

JAMAICA

Communicable diseases—Four weeks ended September 12, 1931.—During the four weeks ended September 12, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica, outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis	1	2	Paratyphoid fever		1
Chicken pox		1	Poliomyelitis		1
Diphtheria	1	1	Scarlet fever		3
Dysentery		3	Tuberculosis	39	65
Leprosy		1	Typhoid fever	25	62
Lethargic encephalitis		1			

TRINIDAD

Port of Spain—Vital statistics—August, 1930, 1931.—The following statistics for the month of August, 1930 and 1931, are taken from a report issued by the public health department of Port of Spain, Trinidad:

	1930	1931		1930	1931
Number of births	123	144	Death rate per 1,000 population	18.2	21.1
Birth rate per 1,000 population	21.5	24.7	Deaths under 1 year	28	15
Number of deaths	104	123	Deaths under 1 year per 1,000 births	200.2	104.2

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931 4	11	18	25	August, 1931 1	8	15	22	29	September, 1931 5	12	19	26
Ceylon: Colombo	C	1		1	1					1	1	1						
	D			1	1					1	1	1						
China:																		
Canton	C		1	2	1									1	1			
	D			1														
Shanghai	C						1				1	5	1	1	3	4	2	
Swatow	C				10	7												
Tientsin	C			1	10													
	D			1	1													
India	C	8,968	11,462	13,604	18,001	4,737	5,002	5,707	6,628	7,357	9,848							
	D	4,550	5,767	7,270	10,337	2,677	2,848	3,064	3,504	4,029	5,584							
Bombay	C		2				1	11	11	9	18	6	11	27	5	5		
	D		1					6	10	4	9	7	5	9	5	2		
Calcutta	C	436	310	265	292	72	62	55	48	42	27	20	21	10	3	15		
	D	256	176	149	168	35	34	58	28	10	7	7	6	4	2	3		
Karikal	C	12	19	12								1		1				
	D	12	14	7								1		1				
Madras	C	20	26	52	9	2	2			1		2	3	3	1	1		
	D	10	13	17	4													
Moulmein	C							1										
	D							1										
Negapatam	D													1				
Rangoon	C			2	4		1	2	1		1	1						
	D			1	2			1			1	1						
Vizagapatam	C				1													
India (French):																		
Chandernagor	C	7	6	4	3	1	1	1	2	1	4	2						
	D	6	5	4	3		1			1	4	2						
Pondicherry	C	100	24	17	3		1	1	1	1	1	1		2				
	D	18	4	7	3		1	1	1	1		1		1				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26
India (Portuguese)	C				1		2				1							
	D						1				1							
Indo-China (see also table below):																		
Cochin-China—Rachgia	C									P								
Pnompenh	C		2		1		1	1			1		1			1		
	D	1	1	2	1		1	1			1					1		
Saigon and Cholon	C	5	27	104	61	8	3	3										
	D	5	22	76	41	3	2	2										
Iraq:																		
Abulkhasib	C													[illegible]				
	D													[illegible]				
Amara	C												2	[illegible]	[illegible]	[illegible]	1	
	D												1	21	[illegible]	[illegible]	1	
Amara Province	C													[illegible]	[illegible]	[illegible]	[illegible]	32
	D													[illegible]	4	[illegible]	[illegible]	29
Basra	C									3	[illegible]	[illegible]	272	[illegible]		[illegible]	[illegible]	[illegible]
	D									2	8	140	137	[illegible]		[illegible]	[illegible]	[illegible]
Basra Province	C												[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	26
	D												2	10	3	[illegible]	10	9
Dinwaniyah	C																	1
Dinwaniyah Province	C																	15
	D																	11
Iwaniyah	C																	27
	D																	15
Muntafiq Province	C													[illegible]	[illegible]		[illegible]	[illegible]
	D													[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Nasiriyah	C														[illegible]			[illegible]
	D														[illegible]	4	[illegible]	3
Suqelshuyukh	C													[illegible]				
	D													[illegible]				
Persia: Rafsanjan [1]	C			36														
	D			14														

Philippine Islands,[2] Provinces—																		
Capiz	C	48	29	17	4										9	9	17	49
	D	41	24	15	4										5	6	5	35
Cebu	C										1	1	1					
	D										1	1	1					
Iloilo	C	7			26	24	3											
	D	4			21	22	3											
Masbate	C	21																
	D	9																
Negros, Occidental	C				2													
	D				1													
Pampanga	C			1														
Siam	C	10	16	14	4	1	1		1				1					
	D	2	4	5	2		1											
Ayudhaya District	C	1																
Bangkok	C	3	3	3	1	1			3				1					
	D	2	2	1	1				2									
Bismulok Province	C	8																
	D	2																
On vessel:																		
S. S. Arankola, at Rangoon from Calcutta	C			1														
S. S. City of Eastborne, at Calcutta from Cocanada	C				1													
S. S. Tairea, at Penang from Calcutta	C				1													
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C								1									
	D								1									
S. S. Kohistan, at Basra from Bushire, Persia	C								2									
S. S. Cathay at Kobe, Japan, from Shanghai	C												4					
	D												1					
S. S. Kasagi Maru, at Moji from Shanghai	C														1			
S. S. Ankoo, at Nagasaki from Shanghai	C															2		
	D															1		

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			Aug. 1-10, 1931
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	
Indo-China (French) (see also table above):														
Cambodia [3]	C	125	100	113	33	44	40	83	96	129	72	82	87	12
	D	80	29	70	20	22	21	45	64				60	2
Cochin-China [3]	C	29	105	107	47	52	75	71	69		66	30	47	39
	D	18	73	74	36	40	57	52	54				42	32

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26
Algeria:																		
Algiers	C	1								2								
	D	1																
Bone	C				1													
Philippeville	C							1				1	1					
	D							1				1						
Argentina: San Juan Province	C							P	P									
Belgian Congo	C	2			1													
	D	2			1													
British East Africa (see also table below):																		
Tanganyika	C	8	18	46	17			6				8						
	D	1	21	30	10			6				2						
Uganda	C	19	35	138	298	95	132	98	93	71	93							
	D	19	32	126	286	94	129	96	90	71	93							
Ceylon: Colombo	C	8	4	3	2				1	4	1	1			1	1		
	D	7	3	3	2				1	4	1	1			1	1		
Plague-infected rats		4	1	5						1	3	4						
China:																		
Amoy [1]	C			1														
	D			1														
Changchuanpu	C																18	
Dutch East Indies:																		
Batavia and West Java	C	84	74	59	116	21	18	19	17	12	11	20						
	D	80	71	59	66	21	13	19	17	12	11	20						
East Java and Madura	C	4	1	1														
	D	4	1	1														
Java and Madura	D	277	243	176	192	59	55	52	66	38	53	67	47	58				
Egypt:																		
Alexandria	C	1			4	1	1	2	9	4	3	1	1	2	2		1	1
	D				4	1			4	1	2			1	1			
Assiout	C	13	32	18	11													
	D	6	17	7	1													
Beni-Suef	C		12	5														
	D		3	3														
Beheira	C									1		1			2			
Cairo	C	1																
Dakahlia	C							1			2							
Deirout	C		3	10	3													
	D		1	4	1													

Gharbieh	C				1													
	D				1													
Girga	C	86	44	7		1												
	D	24	22	2														
Kena	C	5	3	1														
	D	2	1	1														
Manfalut	C	17																
	D	3																
Minieh	C	3	1	6	3	10		2										
	D	2		3	1	2		1	1									
Port Said	C				3	1	1	2	1	2								
	D			1	2	1												
Tanta	C											2			1		1	
Hawaii Territory:																		
Hawaii—Hamakua—Plague-infected rats				1								1						
Maui Island—																		
Haliimaile—Plague-infected rats																	1	
Kula District	C										1							
	D										1							
India	C	9,139	6,142	752	88	30	29	78	84	164	175							
	D	7,037	5,199	692	51	15	13	42	58	94	117							
Bassein	C		1	1		1			3		1		1		1	2		
	D		1	1		1			2		1		1		1	2		
Bombay	C	4	11	8		1	1	11										
	D	3	11	6				6										
Plague-infected rats		70	137	94	37	11	16	9	12	8	13	17	9	23	17			
Burma	C							7	9									
	D							5	5									
Calcutta	C		2															
	D		2															
Madras Presidency	C	23	3	2	6	1	2	8	10					9	6	39		
	D	21	2	1	1		1	1	7					4	5	20		
Moulmein	C						1	1	7					P	5			
	D							1							4	3		
Rangoon	C	1	1	2	1			2		1				2				
	D	1	1	2	1			1		1				1				
Plague-infected rats		7	4	7	3	1	2	2	1	1		1	1	1				
Indo-China (see also table below): Pnompenh	C				3													
	D	6	4		2													
Iraq:																		
Baghdad	C	8	23	23	23	1	1	1				1			1	1		
	D	5	8	9	9	1		1										
Maudhan	C			2														
Madagascar (see also table below): Tamatave	C									1						2		
Nigeria: Lagos	C		5															
	D		5															
Plague-infected rats			6															
Peru (see table below).																		
Senegal (see table below).																		

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, sinc April.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26
Siam	C	31	1	2	1													
	D	7	1	2	1													
Bangkok	C	29																
	D	6																
Nagara Rajsima	C	1																
Spain: Hospitalet—Barcelona Province	C												5	1			1	
	D												2				1	
Syria: Beirut	C						1		1			1				1		
Tripolitania	C	1																
Tunisia: Tunis	C	10	16	16	11													
	D	4	8	3	1													
Union of South Africa:																		
Cape Province	C		3															
	D		3															
Plague-infected rats												1						
Orange Free State	C	6	2	2														
	D	1	2	2														

Place		Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931	Aug., 1931
British East Africa (see also table above):							
Kenya	C	7	345	245	154	484	197
Indo-China (see also table above)	C	4	11		2	1	
	D		2		2	1	
Madagascar (see also table above):							
Ambositra Province	C	70	30	19	15	1	
	D	86	29	18	15	1	
Antsirabe Province	C	83	48	7	12	13	
	D	74	47	7	12	12	
Miarinarivo Province	C	19	6	2		8	
	D	19	6	2		7	
Moramanga Province	C	1		2	1	1	
	D	1		2			
Tananarivo Province	C	90	41	15	10	5	
	D	81	40	18	9	5	

Place		Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931	Aug., 1931
Peru	C	8	8	2	5	2	
	D	2	1		1		
Senegal:							
Baol [1]	C			4		27	101
	D			3		13	58
Dakar [1]	C		2	63	64	95	194
	D		1	49	56	73	106
Louga [1]	C	14	1	5	4	3	2
	D	6		2	2	1	1
Rufisque [1]	C			1	2	34	2
Thies [1]	C				12	16	26
	D				3	7	16
Tivaouane [1]	C		4	19	3	3	
	D			11	2	2	

[1] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931 4	11	18	25	August, 1931 1	8	15	22	29	September, 1931 5	12
Algeria:																
Algiers	C	2	2	1	8			1								
Constantine	C	1		1		1									1	
Belgian Congo	C			47	42											
Bolivia.[1]																
Brazil: Porto Alegre (alastrim)	C	49	53	19	5	9	10	9	13	11						
	D	1					1			1						
British East Africa: Tanganyika	C	8		13	7	37	83		29	1	18					
	D	3				7	5		5							
British South Africa:																
Northern Rhodesia	C						21									
Southern Rhodesia	C				1		2									
Canada:																
Alberta	C							1			1					
British Columbia	C								2	2			3		1	1
Manitoba	C				4											
Winnipeg	C															1
Nova Scotia	C		1													
Ontario	C		9	17	32	14	3	6	12	1		2	2	4		2
Kingston	C	1	5												1	
Ottawa	C				1											1
Sault Ste. Marie	C		4	1												
Toronto	C	2	4	1	1											
Quebec	C					1										
Saskatchewan	C	58	46	48	54		13	10	19		10	6	10	8	8	12
Regina	C	2	2	2												
Canary Islands: Las Palmas	C	1														
Chile:																
Antofogasta	C					1										
Chanaral	C			1												

[1] An epidemic of smallpox was reported on May 18 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12
China:																
Amoy	C	1	2	6	4	1	1			1						
	D	1	1	3	3	1	1			1						
Canton	C	7	4	3	1	1			1					1		
Foochow	C	P	P	P	P				P		P		P			
Hankow	C	3	3	5	4	1										
Hong Kong	C	2	3	1												
	D	2	1	2												
Manchuria—																
Harbin (see also table below)	C	2		3												
Kwantung—Dairen	C	2	2	2	1											
Nanking	C	P	P	P												
Shanghai—																
Foreigners only	C	6	17	7	11	2	1									
Including natives	D	10	18	7	13	2	1	2	1				1	1		
Swatow	D	26	2													
Tientsin	C			2			2	1								
Chosen (see table below).																
Colombia:																
Cali	D			1												
Santa Marta	D															1
Dutch East Indies:																
Batavia and West Java	C	1		2												
East Java and Madura	C			1												
Finland	C		1													
France (see table below).																
Great Britain:																
England and Wales	C	795	744	570	257	56	45	50	36	26	25	19	21	33		19
Bradford	C	2	6	8	5											
Leeds	C	1	2	2												
London	C	147	227	183	122	21	9	12	12	6	12	4	4	3		5
London and Great Towns	C	544	558	403	228	53	33	31	32	22	20	17	10	13	30	11
	D		2		1	1										
Sheffield	C	10	7													1

Greece (see table below).																
Honduras:																
Tegucigalpa	C		1													
Tela	C		1													
India	C	11,791	14,265	11,403	7,313	1,492	1,376	1,236	1,255	978	904					
	D	2,251	2,923	1,849	1,704	404	363	292	293	234	213					
Bassein	C			1												
Bombay	C	10	8	9	6		1	3	2	1		1			1	
	D	4	5	4	5		1	3	2	1					1	
Calcutta	C	382	287	89	47	11	6	2	2	4	4		5	2	1	2
	D	203	224	75	41	9	4	3	2		4		5	2	1	2
Cochin	C	46	39	3							1	1	1			
Karachi	C	4	6		2					1						
	D	2			1											
Madras	C	22	19	8	2		2			1					1	
	D	3	5	6	1											
Negapatam	C		3		3			1			2			3		1
Rangoon	C	3	11	13	6	2		1		2		1	1	1		1
	D	1	1	5	2	1				1			1			1
Vizagapatam	C	2	10	6	6	2		2	1		3		2	3	1	1
	D	1	2	1	2	1					3		1	3	1	1
India (French):																
Chandernagor	C	14	10	7	1	2		1								
	D	2	7	5		2										
Karikal	C	3	4	4	6	1	1	1	1	1	1	3	2			
	D		3	4	6	1	1	1	1	1	1	2	2			
Pondicherry Province	C	14	6	11	7	4	1		23	11			3	1	6	1
	D	14	9	11	7	4	1		23	11			3	1	6	1
India (Portuguese)	C	8	21	3												
	D	3	6	1												
Indo-China (see also table below):																
Pnompenh	C	1		1	2											
	D			1												
Saigon and Cholon	C	8	1	2		1			2	1	1			1		2
	D	8	1	1		1				1				1		2
Iraq:																
Baghdad	C		2	3	1											1
	D			2												
Basra	C			2	1											
Mosul Liwa	C							1					1			
Ivory Coast (see table below):																
Japan: Nagoya	C							1								
Mexico (see also table below):																
Jalisco (State)—Guadalajara	D	1	1	2	1	1	1		1			2				
Mexico City and surrounding territory	C	33	43	45	25	12	5	4	1	8	2			2	2	
	D	22	14	11	13	4	3	1		1	1					
Monterrey	C				1											
Torreon	C		1	1	3										1	1
	D		2		2											1
Vera Cruz	C	2	2	1												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12
Morocco (see table below).																
Nigeria: Lagos	C	2														
Poland	C			3	3		17		1							
Portugal: Lisbon	C	52	56	67	48	15	12	13		17	12	5		10	21	18
Rumania (see table below).																
Siam	C		1	6	5		1									
	D			1	1			1								
Spain	C	P						7								
Straits Settlements	C	4	10	2							1					
	D	1	5	2												
Sudan (Anglo-Egyptian)	C	8	3	6	1											32
	D	2		2												6
Sudan (French) (see table below).																
Syria (see table below).																
Tunisia: Tunis	C	4														
Turkey (see table below).																
Union of Socialist Soviet Republics (see table below).																
Union of South Africa:																
Cape Province	C	P	P	P												
Natal	C															P
Orange Free State	C	P	P	P	P	P	P	P				P				
Transvaal	C	P			P	P	P	P								
Upper Volta	C	3	3	83	12	1		1								
	D	1		1												
On vessel:																
S. S. Rotterdam at Naples from Venice	C	1														
S. S. Clan McTavish at Manila from Chittagong	C		1													
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C		1										1			
S. S. Talodi at Suakin	C			1												

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
China: Harbin (see also table above)	C			7		13	10	
Chosen	C	1		11		1	4	
	D	1		3				
France	C	4	16	15	6	54		
Greece	C		4			3	1	
Mexico (see also table above)	D		3		1	1	2	
Morocco	C		4	6	7	49	48	23

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Rumania	C			1		1		
Turkey	C	63	37	1		9	1	
	D	7	6					
Union of Socialist Soviet Republics	C				1,516	1,345		
Territories in Asia	C	194	532					
Ukraine	C	44	23					
Other territories in Europe	C	896	1,577					
Railroads, etc.	C	43	77					

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			August, 1931		
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31
Indo-China (see also table above)	C	168	264	142		17	41	30	16	1	1		7	29		
	D	35	82								1		4	11		
Ivory Coast	C															7
Sudan (French)	C		4													
Syria: Beirut	C								1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19
Algeria:																	
Algiers	C	3	3	7	9			2									
Bone	C											1	1				
Constantine Department	C	3	9	22	26	2		1		3							
Oran	C		1	2	2						1					1	
Australia, Western	C	1	1	1													
Bulgaria	C	9	30	16	30									1			
	D	2	3	4	6												
China:																	
Canton	C	1															
Manchuria—Harbin	C	3	8		16												
Shanghai	C							1									
Tientsin	C		2														
Chosen (see table below).																	
Colombia: Cali	D														1		
Czechoslovakia (see table below).																	
Egypt:																	
Alexandria	C		1		3												1
Beheira Province	C		4														
	D		2														
Cairo	C													1			
Eritrea: Asmara	C	1															
Great Britain: Scotland—Fife County	C			1													
Greece (see table below).																	
Guatemala [1] (see table below).																	
Iraq: Baghdad	C	2		2													
	D			2													
Irish Free State:																	
Cork County—																	
Schull	C						1										
Skibbereen	C				2	1											
Kerry County—																	
Dingle	C			1													
Listowel	C				1												

Limerick County—																	
Glin	C															2	
Limerick	C					2				1							
Michelstown	C					1											
Mayo County—																	
Belmullet	C			1													
Castlebar	C												1				
Westport	C												1				
Japan	C				1												
Latvia (see table below).																	
Lithuania (see table below).																	
Mexico (see also table below):																	
Durango	D								1								
Mexico City, including municipalities in Federal District	C	216	170	75	46	28	9	7	9	7	6		5				
	D	84	56	33	19	4	3	2	3	5	3		2				
San Luis Potosi	C	5	3	2			1	3					1				
Torreon	C								1								
	D								1								
Morocco	C	7	13	42	101	37	20	24	21		2	1	5				
	D		1	4	6	4	4										
Palestine	C	5	5	4	5	2				3	3	1	4				4
Panama Canal Zone—Balboa	C			2													
Paraguay: Asuncion	D	1															
Poland	C	287	538	298	97	9	17	13	14	10	4	10	7	6	2		
	D	15	28	18	4	2	1	1	1	1		1					
Rumania	C	214	70	169	80	2	2	7		7	9						
	D	16	8	18	13	2	2	1			1						
Syria	C			4													
Tunisia:																	
Sbeitla, vicinity of	C	20	12														
	D	7															
Sfax	C	2															
Tunis	C	14	13	29	73	1			1					1			
	D			3	4												
Turkey (see table below).																	
Union of Socialist Soviet Republics (see table below).																	
Union of South Africa:																	
Cape Province	C	1	P	P	P	P	P	P	P		P	P					
Municipality of East London	C	P			1					1							
Natal	C	1	P	P	P			P	P		P						
Orange Free State	C	P	P	P	P	P	P	12	P								
Transvaal	C	P	P	P	P	P	P	P	P		P	P					
Yugoslavia (see table below).																	

[1] On Feb. 27, 1931, the Director General of Public Health of Guatemala reported an unusual outbreak of typhus fever in a small village in Guatemala.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Chosen: Seoul	C	124	3	4		6	
	D	8		1		1	
Czechoslovakia	C	26		5	11	2	
Greece	C	17	8	22	6	9	1
	D	2	1	3			
Guatemala	C					33	34
	D					15	5
Latvia	C	12					
Lithuania	C	3	99	34	10	13	
	D	1	3	5		2	

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Mexico (see also table above)	D	83					
Turkey	C	18	15		3	3	2
Union of Socialist Soviet Republics:							
Territories in Asia	C	260					
Ukraine	C	419					
Other territories in Europe	C	1,373					
Railroads, etc	C	158					
Yugoslavia	C	12	10	43	14	2	3
	D		1	5			

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26
Brazil:																		
Alagoas State	C											1						
	D											1						
Bahia State	C	1																
Ceara State	C	2	2	1	1							1	1					
	D		2	1									1					
Minas Geraes State	C	2	5	2														
	D	1	2	1														
Rio de Janeiro State	C	2		2														
	D	2																
Cambucy	C	1																
Sergipe State	C				1													

British Cameroons: Mamfe	C			3	2													
	D			2														
Colombia—Magdalena Province—Near Cienaga	C							4										
Gold Coast:																		
Akuse	C					2												
	D					1												
Dagomba District	C									2								
Kintampo	C							1										
	D							1										
Oda	C																1	
	D																1	
Tamale	C						2											2
	D						2											2
Wale Wale	C									1								
	D									1								
Ivory Coast:																		
Bobo Dioulasso	C						1											
	D						1											
Grand Bassam	C									4							1	
	D									2							1	
Kong Circle	C							4										
Seguela	C												P					
Nigeria: Abakaliki	C										1							
	D										1							
Senegal:																		
Podor (Hinterland)	C												1					
	D												1					
Thies	C																	1
	D																	1
Sudan (French)	C							4	P									
Togo: Seva	C																1	
Upper Volta:																		
Banfora	C								2									
	D								1									
Diarabokoko	C																	2
	D																	1
Ouagadougou	C												1					1

X

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OCTOBER 16 - - 1931

SPECIAL ARTICLES

Experimental Transmission of Endemic Typhus by X. cheopis

Sickness Among Male Industrial Employees, 2d Quarter, 1931

UNITED STATES
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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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TYPHUS FEVER

THE EXPERIMENTAL TRANSMISSION OF ENDEMIC TYPHUS FEVER OF THE UNITED STATES BY THE RAT FLEA XENOPSYLLA CHEOPIS

By R. E. Dyer, *Surgeon*, E. T. Ceder, *Assistant Surgeon*, R. D. Lillie, A. Rumreich, and L. F. Badger, *Passed Assistant Surgeons*, *United States Public Health Service*

The incidence of endemic typhus fever in the United States, especially in the cities and towns of the southeastern States, has been brought to general attention in the past few years largely by the work of Maxcy (1). Whether endemic typhus of the United States is of European origin or represents an importation of Mexican tabardillo, or whether it is indigenous to the United States, is a matter of conjecture. Endemic typhus shows certain differences from the European, or epidemic, typhus, especially differences of an epidemiological nature. Epidemic typhus has its greatest prevalence in winter; it is associated with crowding; it is most prevalent in the lower strata of society; multiple cases in households, jails, and hospitals are common; and it has been shown repeatedly to be associated with lousiness.

In direct contrast to epidemic typhus, the endemic typhus of the United States has its greatest prevalence in summer and fall; it is not associated with crowding; there is no predilection for the lower strata of society; there is no evidence of spread from man to man; and a history of louse infestation is noticeably rare. The epidemiological manifestations of epidemic typhus are explained by taking into account the habits of the known vector, the body louse, while the epidemiology of endemic typhus suggests some ectoparasite of the rat. Thus, Maxcy (1) noted that especially those persons employed in food-handling establishments are exposed to an increased risk of infection, and Rumreich (2) noted that 75 per cent of the endemic typhus cases studied by him in 1930 were associated with rat infestation. Endemic typhus is more closely associated with the place of employment than with the domicile. The epidemiological features of endemic typhus quite definitely rule out of consideration the body louse, established by Nicolle (3) as the vector of epidemic typhus; the head louse, shown by Goldberger (4) to be infectible with Mexican typhus, and the bedbug, shown by Castaneda and Zinsser (5) to retain the typhus virus

in infectious form after intracoelomic injection. Three species of ticks have also been shown by Zinsser and Castaneda (6) to be capable of retaining typhus virus after intracoelomic injection. Following the recognition of the fact that cases diagnosed as typhus and occurring in the rural sections of the eastern States were in reality an eastern type of Rocky Mountain spotted fever (2) (7), coupled with the known urban characteristics of endemic typhus, the possible rôle of the tick in the transmission of typhus remains uncertain.

It should be noted that neither the bedbug nor the tick have been experimentally infected by feeding, nor have they been shown to transmit the infection in a manner possible in nature.

To be in agreement with the epidemiological evidence the vector of endemic typhus must be a blood-sucking parasite which will feed both upon the rat and upon man. Evidence of the importance of such a parasite would be strengthened by the recovery of the virus of endemic typhus from such parasites taken at foci where human cases of typhus have occurred recently.

Early in this year the recovery of a typhus-like virus from fleas taken from wild rats caught at typhus foci in Baltimore was reported (8). This was later confirmed by recovery of a similar virus from fleas taken at a typhus focus in Savannah, and each of these strains of virus was shown to be the virus of endemic typhus (9). The importance of these observations has been emphasized by the recovery of typhus virus from the brains of wild rats by Mooser, Castaneda, and Zinsser (10), working in Mexico City. Kemp (11) has confirmed recently our findings on the rat flea by reporting the recovery of endemic typhus virus from fleas caught at typhus foci in Texas. Shelmire and Dove (12) have reported some cases of endemic typhus which have suggested to them the possibility of the tropical rat mite (*Liponyssus bacoti*) being a vector of endemic typhus. The findings mentioned support the original hypothesis of Maxcy, based on his epidemiological observations, that a rodent reservoir of typhus exists in this country. That the rat louse may play a part in keeping the infection alive in rats is shown by the experimental transmission of Mexican typhus by this arthropod by Mooser, Castaneda, and Zinsser (13). These authors point out that this louse "* * * has, of course, no importance in transmission of the disease from rat to man, since it does not feed on human beings."

As a step in the elucidation of the manner by which the flea transmits endemic typhus, either from rat to rat or from rat to man, we have attempted experimental transmission of endemic typhus using one of the species of flea (*Xenopsylla cheopis*) incriminated by our previous work (8) (9). Preliminary reports of this work on experimental transmission have already been made (14) (15).

In the studies of experimental transmission of typhus virus by the flea, metal and glass boxes 24 inches long, 14 inches wide, and 18 inches deep have been used. The bottoms and corners were made of copper, the sides and ends being of glass. Tops were made of fine copper wire screening stretched over metal frames. A trap door was placed in each top.

White rats were used as the experimental animals.

VIRUS STRAIN FLEA X1–A

Approximately 50 fleas (*X. cheopis*, hand lens identification) were placed in glass box X1. White rats were injected with endemic typhus virus (Baltimore and Savannah flea strains (8) (9)) and placed in the same glass box. Approximately two weeks after the first infected white rat had been placed in box X1, rickettsiae were found in smears made from fleas removed from this box. Six fleas were then removed from this box, emulsified in physiological salt solution, and injected into two guinea pigs. One of these guinea pigs developed the characteristic signs of clinical endemic typhus described by Maxcy (16) for the strain of endemic typhus virus derived by him from a human case in Wilmington, North Carolina, and known as the "Wilmington" strain. This strain of virus, recovered from the fleas, was carried in guinea pigs and rabbits for three generations, and then dropped. Four guinea pigs were used in each generation; the majority of the animals in each generation developed clinical endemic typhus. Smears made from the tunica vaginalis of one of the guinea pigs in the second generation showed rickettsiae. Virus (testicular washings) from this guinea pig was used to inoculate two rabbits (2901A and 2901B). The development of agglutinins for *B. proteus* X_{19} (type O) by these rabbits is shown in Table 1.

TABLE 1.—*Agglutination of B. proteus X_{19} (type O) by rabbit sera. (Rabbits inoculated with virus, flea X1–A; original source, emulsified fleas from box X1)*

Rabbit	Number of weeks after inoculation	Serum dilutions 1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1,280
2901A	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0
	2	4	4	3	1	0	0	0	0
	3	4	4	4	3	0	0	0	0
	4	4	4	3	2	0	0	0	0
	5	4	4	3	0	0	0	0	0
	7	4	3	2	0	0	0	0	0
2901B	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0
	2	4	3	3	3	2	0	0	0
	3	4	4	2	0	0	0	0	0
	4	4	4	4	2	0	0	0	0
	5[1]	-------	-------	-------	-------	-------	-------	-------	-------

[1] Rabbit accidentally killed.

VIRUS STRAIN FLEA X1-B

Noninfected white rats and additional infected white rats were then placed in box X1. After a residence of about two weeks in the box, one of the originally noninfected white rats (rat 2766) was removed and killed. Six fleas were removed from this rat, emulsified in physiological salt solution, and injected into two guinea pigs. Both animals developed clinical endemic typhus. This strain of virus was carried in guinea pigs and rabbits for three generations and then dropped. All guinea pigs inoculated with this virus developed clinical endemic typhus. Rickettsiae were found in smears made from the tunica vaginalis of guinea pigs infected with this virus. The development of agglutinins for *B. proteus* X_{19} (type O) in the sera of two rabbits (3084A and 3084B) inoculated with this strain of virus is shown in Table 2.

TABLE 2.—*Agglutination of B. proteus X_{19} (type O) by rabbit sera. (Rabbits inoculated with virus, flea X1-B; original source, emulsified fleas from box X1)*

Rabbit	Number of weeks after inoculation	Serum dilutions 1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1,280
3084A	0	3	1	0	0	0	0	0	0
	1	4	4	4	4	2	0	0	0
	2	4	4	4	4	1	0	0	0
	3	4	4	4	4	2	0	0	0
	4	4	4	3	0	0	0	0	0
3084B	0	0	0	0	0	0	0	0	0
	1	4	4	4	4	4	3	2	0
	2	4	4	4	4	4	3	0	0
	3	4	4	4	4	4	3	0	0
	4	4	4	4	4	2	0	0	0
	5	4	4	3	2	0	0	0	0

VIRUS STRAIN RAT X1

The brain and spleen from the originally noninfected white rat (rat 2766) taken from box X1 were removed and inoculated, separately, into guinea pigs. These animals developed clinical endemic typhus. This strain of virus was carried in guinea pigs and rabbits for seven generations and then dropped. Of the 53 guinea pigs in these seven generations, 37 developed clinical endemic typhus. Rickettsiae were found in smears made from the tunica vaginalis of guinea pigs infected with this virus. Histological examination was made of the brains from two guinea pigs from this strain of virus. One of the brains showed the lesions characteristic of endemic typhus. (See p. 2497.) The development of agglutinins for *B. proteus* X_{19} (type O) in the sera of rabbits inoculated with this strain of virus is shown in Table 3.

TABLE 3.—*Agglutination of B. proteus X_{19} (type O) by rabbit sera. (Rabbits inoculated with virus, rat X1; original source, white rat 2766)*

Rabbit	Number of weeks after inoculation	Serum dilutions							
		1:10	1:20	1:40	1:80	1.160	1:320	1:640	1:1,280
3055A	0	2	1	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0
	2	4	4	4	4	2	0	0	0
	3	4	4	4	4	2	0	0	0
	4	4	4	3	2	0	0	0	0
	5	4	4	3	0	0	0	0	0
3055B	0	0	0	0	0	0	0	0	0
	1	4	3	0	0	0	0	0	0
	2	4	4	3	0	0	0	0	0
	3	4	4	4	2	0	0	0	0
	4	4	4	2	0	0	0	0	0
	5	4	4	0	0	0	0	0	0
3061B	0	0	0	0	0	0	0	0	0
	1	4	4	4	4	4	0	0	0
	2	4	4	4	4	4	2	0	0
	3	4	4	4	4	3	0	0	0
	4	4	4	4	4	2	0	0	0
	5	4	4	4	3	2	0	0	0
	6	4	4	3	2	0	0	0	0

That guinea pigs which had recovered after injection with virus rat X1 were immune to endemic typhus is shown in Chart 1.

VIRUS STRAIN FLEA X3

The fleas remaining in box X1 were then transferred to a freshly cleaned and sterilized box, X3. White rats infected with typhus and noninfected white rats were placed in box X3. About two weeks later one of the originally noninfected white rats (2772) was killed. Fleas taken from this rat were emulsified and inoculated into guinea pigs. This resulted in the establishment of a strain of virus which has been carried for nine generations in guinea pigs and rabbits. Of 45 guinea pigs inoculated with this strain of virus, 41 have developed clinical endemic typhus.

Histological examination was made of the brains from five guinea pigs from this strain. Two of these brains showed the characteristic lesions of endemic typhus.

Rickettsiae have been found in smears made from the tunica vaginalis of guinea pigs infected with this strain of virus.

The development of agglutinins for *B. proteus* X_{19} (type O) in the sera of rabbits following inoculation with this strain (flea X3) of virus is shown in Table 4.

CHART 1

CROSS IMMUNITY TEST — DAILY TEMPERATURE RECORD

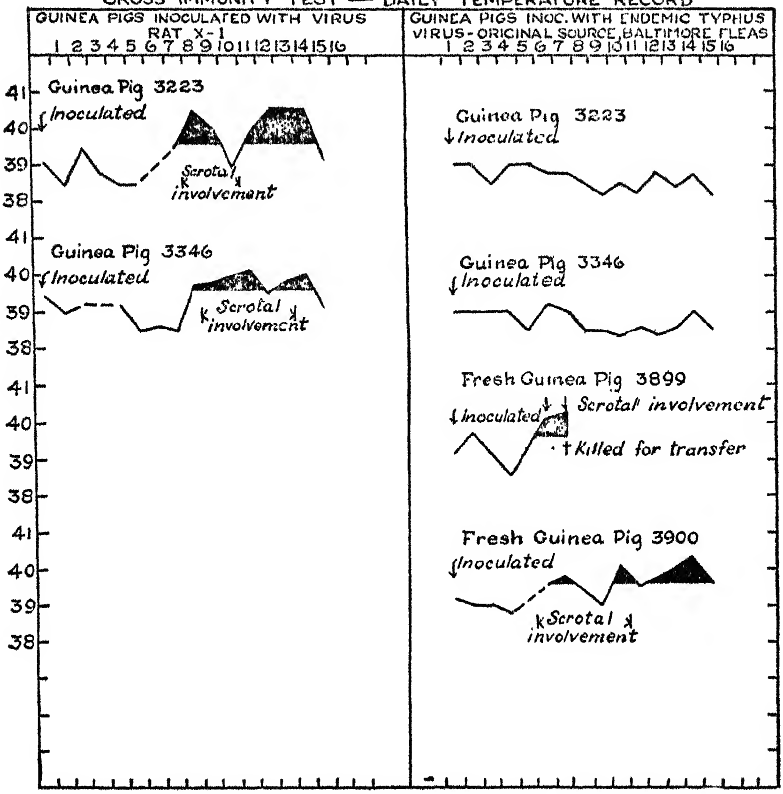


TABLE 4.—*Agglutination of B. proteus X_{19} (type O) by rabbit sera. (Rabbits inoculated with virus, flea X3; original source, emulsified fleas)*

Rabbit	Number of weeks after inoculation	Serum dilutions 1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1,280
3145A	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0
	2	4	4	2	0	0	0	0	0
	3	4	4	2	0	0	0	0	0
	4	4	3	0	0	0	0	0	0
3145B	0	0	0	0	0	0	0	0	0
	1	3	0	0	0	0	0	0	0
	2	4	4	4	4	4	3	0	0
	3	4	4	4	4	4	3	0	0
	4	4	4	4	4	4	0	0	0
	5	4	4	4	4	2	0	0	0
	6	4	4	4	3	0	0	0	0

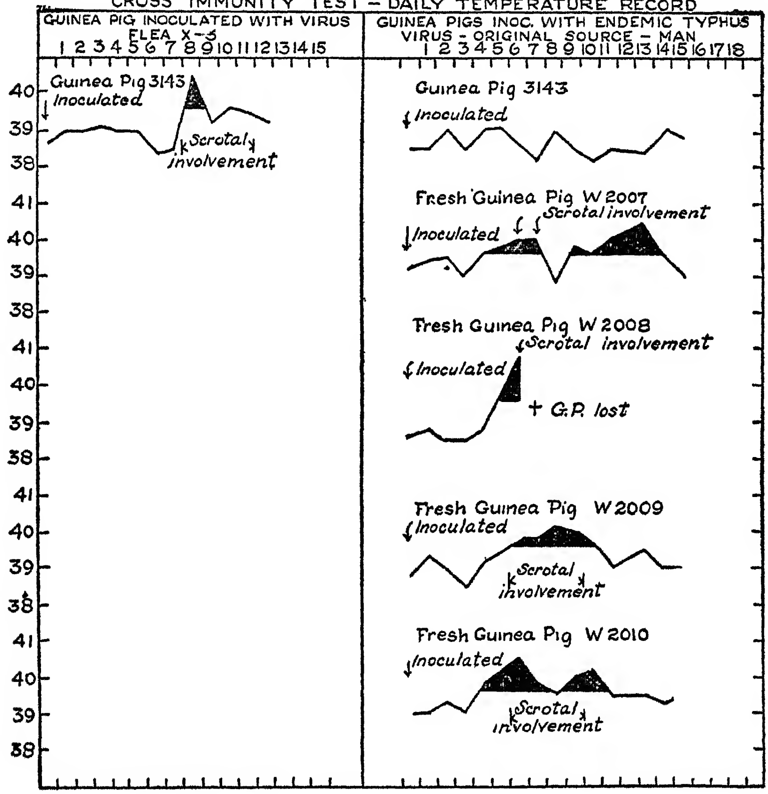
Cross immunity tests show clear-cut cross immunity between endemic typhus virus originally isolated from a human case and the flea X3 strain. This immunity is shown in Charts 2 and 3.

VIRUS STRAIN RAT X3–A

Brain and spleen from originally noninfected white rat 2772, from box X3, were emulsified in physiological salt solution and injected

CHART 2

CROSS IMMUNITY TEST – DAILY TEMPERATURE RECORD

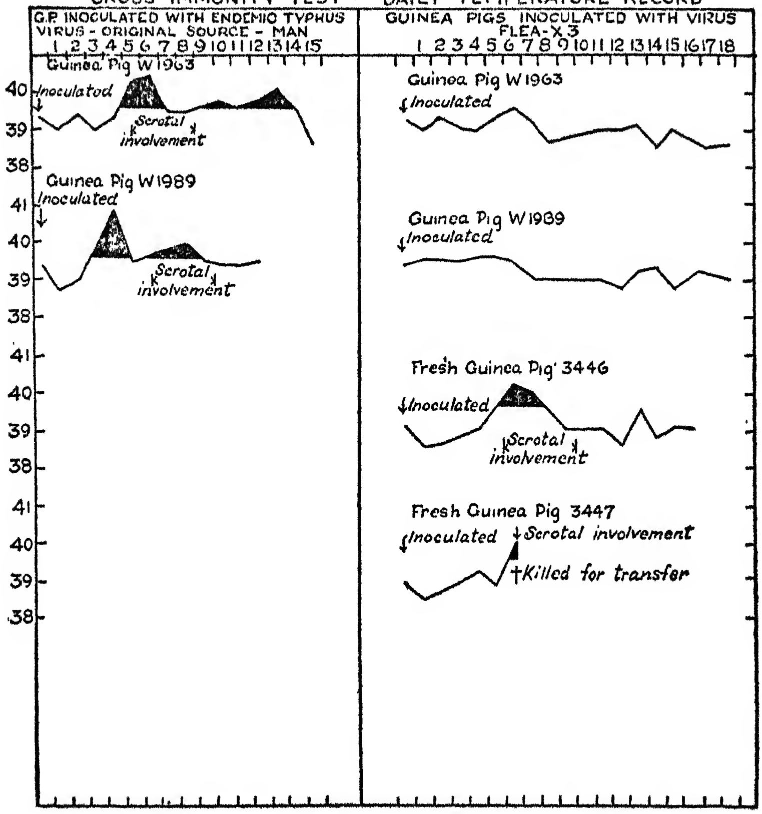


separately into guinea pigs, four animals being inoculated. Each of these guinea pigs developed clinical endemic typhus. This strain of virus was carried in guinea pigs, rabbits, and monkeys for 10 generations. In these 10 "generations" 96 guinea pigs have been used, half of the guinea pigs being inoculated with blood and half with testicular washings. Thirty-two of those inoculated with blood and 35 of those inoculated with testicular washings have developed clinical endemic typhus.

Histological examination has been made of brain sections from 4 guinea pigs from this strain. Two of these brains showed the characteristic lesions of endemic typhus.

CHART 3

CROSS IMMUNITY TEST — DAILY TEMPERATURE RECORD



Rickettsiae (see photomicrograph 456) have been found in smears made from the tunica vaginalis of guinea pigs infected with this strain of virus.

The development of agglutinins for *B. proteus* X_{19} (type O) in the sera of rabbits and monkeys following inoculation with this strain of virus (rat X3–A) is shown in Table 5.

TABLE 5.—*Agglutination of B. proteus X_{19} (type O) by rabbit and monkey sera. (Animals inoculated with virus, rat X3–A)*

Animal	Number of weeks after inoculation	Serum dilutions							
		1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1,280
Rabbit 3078A	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0
	2	4	4	4	4	2	0	0	0
	3	4	4	4	3	0	0	0	0
	4	4	4	1	0	0	0	0	0
	5	0	2	0	0	0	0	0	0
Rabbit 3078B	0	0	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0
	2	4	4	4	4	3	2	0	0
	3	4	4	4	4	1	0	0	0
	4	4	4	4	3	0	0	0	0
	5	4	4	3	2	0	0	0	0
Rabbit 3103A	0	2	1	0	0	0	0	0	0
	1	4	4	4	4	2	0	0	0
	2	4	4	4	4	4	3	2	0
	3	4	4	4	4	4	2	0	0
	4	4	4	4	4	0	0	0	0
	5	4	4	3	1	0	0	0	0
Rabbit 3103B	0	3	2	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	4	3	0	0	0	0	0	0
	4	4	3	1	0	0	0	0	0
	5	4	3	0	0	0	0	0	0
Monkey 510	0	4	3	0	0	0	0	0	0
	1	2	4	4	3	0	0	0	0
	2	3	4	4	4	0	0	0	0
	3	4	4	4	4	4	0	0	0
	4	3	4	4	1	0	0	0	0
Monkey 511	0	3	2	0	0	0	0	0	0
	1	4	4	2	0	0	0	0	0
	2	3	4	4	2	0	0	0	0
	3	4	4	4	2	0	0	0	0
	4	3	2	0	0	0	0	0	0

Charts 4 and 5 show the results of cross-immunity tests between the rat X3–A strain of virus and the strains of endemic typhus virus recovered from fleas caught at typhus foci in Baltimore and Savannah.

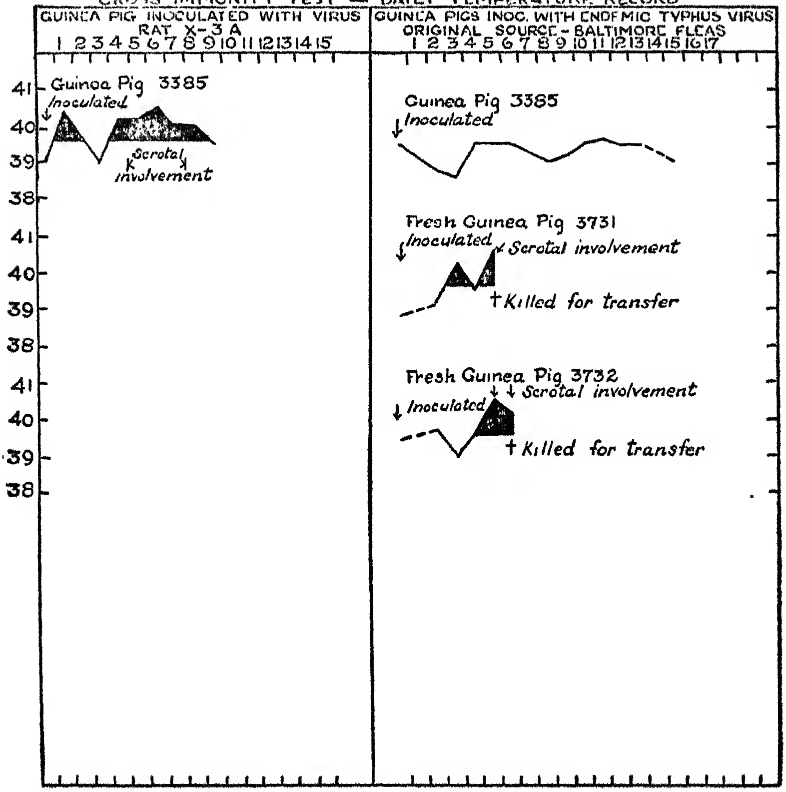
VIRUS STRAIN RAT X3–B

Additional white rats were inoculated with endemic typhus virus and placed in box X3. Fresh, noninfected white rat 3031 was placed in this box and allowed to remain two weeks. At the end of this period the spleen from this rat was emulsified in salt solution and injected into two guinea pigs, the brain being treated in the same

manner. One of the guinea pigs inoculated with splenic emulsion and one of those inoculated with brain, developed clinical endemic typhus. This strain of virus (rat X3-B) has been carried in guinea pigs and rabbits for 11 generations, with results similar to those described for the strain rat X3-A.

CHART 4

CROSS IMMUNITY TEST — DAILY TEMPERATURE RECORD



Histological examination has been made of brain sections of one guinea pig infected with this strain. This brain showed the characteristic lesions of endemic typhus. Rickettsiae have been found in smears made from the tunica vaginalis of guinea pigs infected with this strain of virus.

Table 6 shows the production of agglutinins for *B. proteus* X_{19} (type O) in rabbits following inoculation with virus rat X3-B.

CHART 5
CROSS IMMUNITY TEST — DAILY TEMPERATURE RECORD

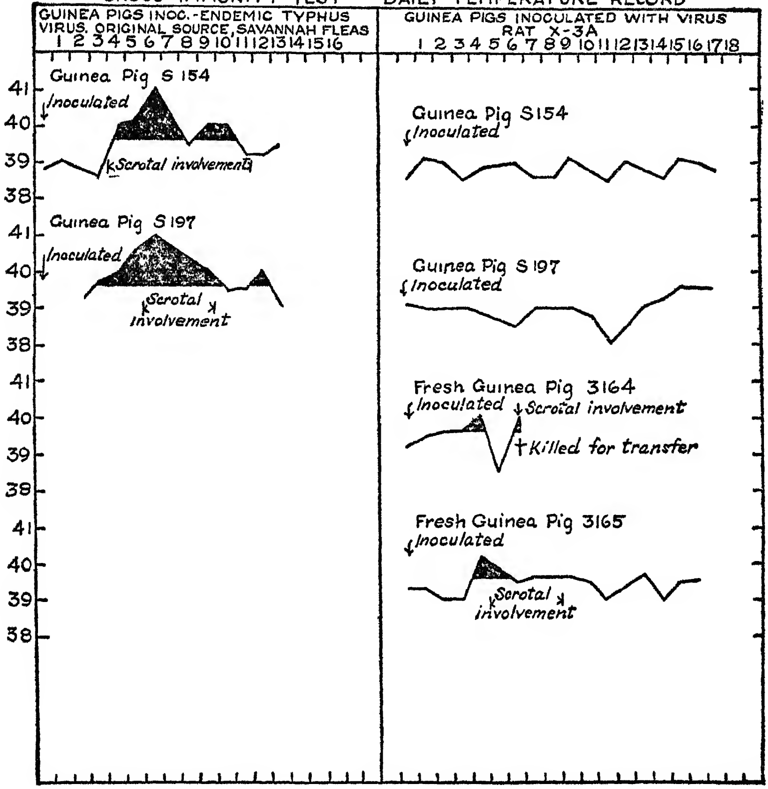


TABLE 6.—*Agglutination of B. proteus X_{19} (type O) by rabbit sera after inoculation of the rabbits with virus, rat X3–B*

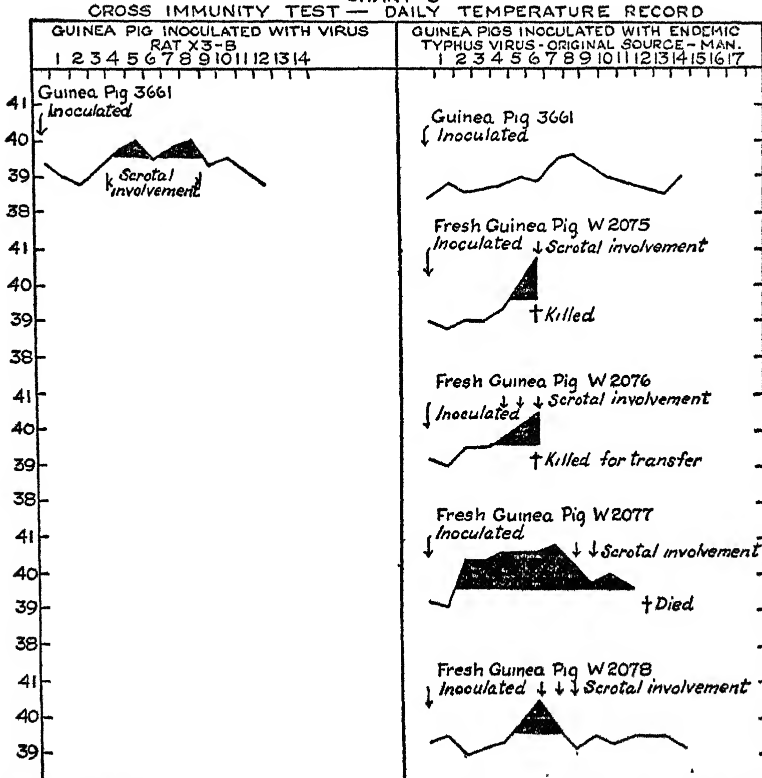
Rabbit	Number of weeks after inoculation	Serum dilutions 1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1,280
3197A	0	0	0	0	0	0	0	0	0
	1	4	3	2	0	0	0	0	0
	2	4	4	4	4	0	0	0	0
	3	4	3	2	0	0	0	0	0
	4	4	3	1	0	0	0	0	0
	5	4	4	4	3	0	0	0	0
3197B	0	2	0	0	0	0	0	0	0
	1	3	0	0	0	0	0	0	0
	2	4	4	1	0	0	0	0	0
	3	4	4	3	0	0	0	0	0
	4	4	4	0	0	0	0	0	0
	5	3	3	0	0	0	0	0	0

Cross immunity tests between strain rat X3-B and strains of endemic typhus are shown in Charts 6 and 7.

It will be noted that originally noninfected rats 2766, 2772, and 3031, from which the strains of virus rat X1, rat X3-A, and rat X3-B were established, were exposed in the glass boxes not only to infected fleas but also to infected rats. To overcome this objection approximately 150 infected fleas were removed from box X3 and placed in freshly sterilized box X7. Three fresh white rats (3241,

CHART 6

CROSS IMMUNITY TEST — DAILY TEMPERATURE RECORD



3242, and 3245) were then placed in box X7. After a residence in the box of 13, 14, and 15 days, respectively, these rats were removed and killed. Two guinea pigs were injected with the emulsified spleen from each rat, and two with the emulsified brain. From white rat 3241 a strain of clinical endemic typhus was recovered (strain rat X7–A), and also from white rat 3245 (strain rat X7–B). The guinea pigs injected with material from white rat 3240 developed febrile reactions, without scrotal involvement, in from 6 to 12 days after inoculation but were not "transferred." Four white rats from

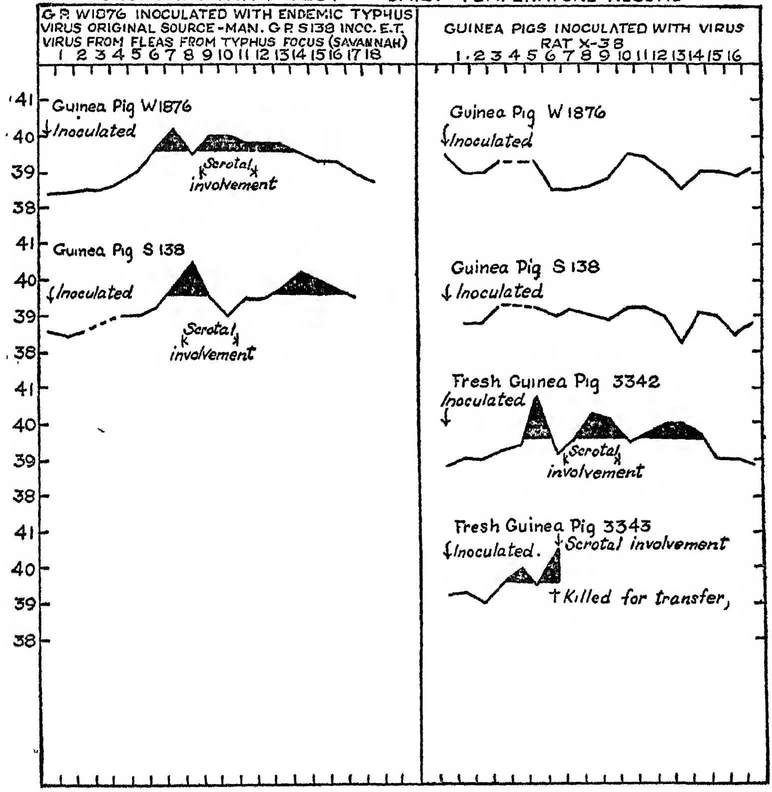
the same lot of rats from which white rats 3241, 3242, and 3245 were chosen, were killed and guinea pigs injected with brain and spleen emulsions. None of these guinea pigs developed clinical endemic typhus.

VIRUS STRAIN RAT X7–A

This strain of virus has been carried in guinea pigs and rabbits for seven generations. Of 40 guinea pigs inoculated with this virus, 31 have developed clinical endemic typhus.

CHART 7

CROSS IMMUNITY TEST — DAILY TEMPERATURE RECORD



Rickettsiae have been found in smears made from the tunica vaginalis of guinea pigs infected with this strain of virus (see photomicrograph 458).

Brains from five guinea pigs from this strain were examined histologically. One of these showed scanty lesions of endemic typhus, one was frankly negative, and three were doubtful.

Table 7 shows the production of agglutinins for *B. proteus* X_{19} (type O) in rabbits following inoculation with virus rat X7–A.

TABLE 7.—*Agglutination of B. proteus X_{19} (type O) by rabbit sera after inoculation of the rabbits with virus, rat X7–A*

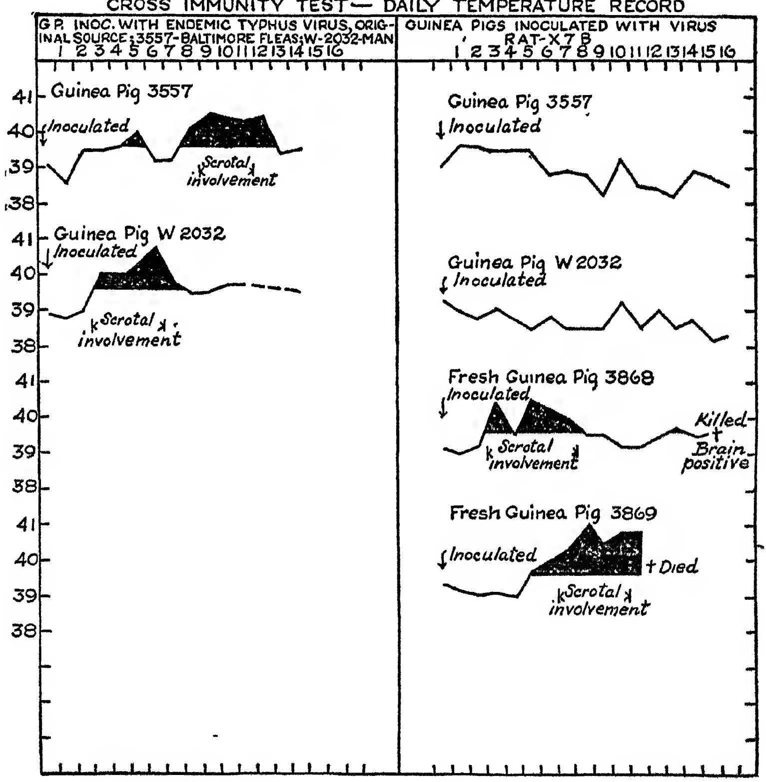
Rabbit	Number of weeks after inoculation	Serum dilutions							
		1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1,280
3870A	0 1 2 3	3 0 4 4	2 0 4 4	0 0 4 4	0 0 4 4	0 0 2 3	0 0 0 0	0 0 0 0	0 0 0 0
3870B	0 1 2 3	2 0 4 4	0 0 4 4	0 0 4 4	0 0 4 4	0 0 2 2	0 0 0 0	0 0 0 0	0 0 0 0

VIRUS STRAIN RAT X7–B

This strain of virus has been carried in guinea pigs, monkeys, and rabbits for seven generations. Of the 60 guinea pigs used, 52 have developed clinical endemic typhus. Rickettsiae have been found in smears made from the tunica vaginalis of guinea pigs infected with this virus.

CHART 8

CROSS IMMUNITY TEST—DAILY TEMPERATURE RECORD



The brains from three guinea pigs infected with this strain of virus have been examined histologically. Two of these showed the lesions characteristic of endemic typhus.

Table 8 shows the production of agglutinins for *B. proteus* X_{19} (type O) in monkeys and rabbits subsequent to their inoculation with virus rat X7–B.

TABLE 8.—*Agglutination of B. proteus X_{19} (type O), by monkey and rabbit sera after inoculation with virus, rat X7–B*

Animal	Number of weeks after inoculation	Serum dilutions							
		1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1,280
Monkey 512	0	2	2	0	0	0	0	0	0
	1	4	4	2	0	0	0	0	0
	2	2	3	4	4	3	1	0	0
	3	2	3	3	4	4	3	2	0
	4	4	4	4	4	4	2	0	0
	5	4	4	4	4	4	2	0	0
	6	4	4	2	0	0	0	0	0
Monkey 515	0	3	0	0	0	0	0	0	0
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	2	3	4	4	4	4	3	2
	4	2	3	4	4	4	4	4	2
	5	3	4	4	4	4	4	2	0
	6	3	4	4	3	1	0	0	0
Rabbit 3428A	0	2	0	0	0	0	0	0	0
	1	4	4	3	1	0	0	0	0
	2	4	4	4	4	2	0	0	0
	3	4	4	4	4	2	0	0	0
	4	4	3	2	2	0	0	0	0
Rabbit 3428B	0	3	0	0	0	0	0	0	0
	1	4	2	0	0	0	0	0	0
	2	4	4	4	4	4	3	2	0
	3	4	4	4	4	4	3	0	0
	4	4	4	4	4	3	1	0	0
Rabbit 3507A	0	0	0	0	0	0	0	0	0
	1	3	3	0	0	0	0	0	0
	2	4	4	4	4	4	4	0	0
	3	4	3	2	0	0	0	0	0
	4	4	4	3	0	0	0	0	0
	5	4	4	2	0	0	0	0	0
Rabbit 3507B	0	2	1	0	0	0	0	0	0
	1	4	4	4	4	3	3	0	0
	2	4	4	4	4	4	4	2	0
	3	4	4	4	4	2	0	0	0
	4	4	4	4	4	2	0	0	0
	5	4	4	4	2	0	0	0	0

The results of the cross immunity tests completed to date between virus strain rat X7–B and endemic typhus virus are shown in Charts 8 and 9.

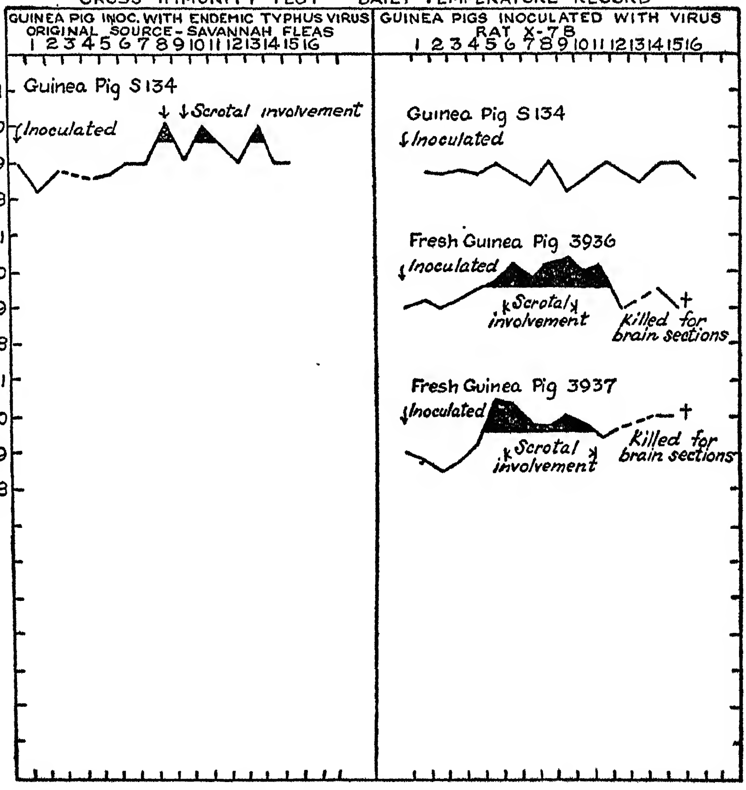
The experiment detailed above for box X7 was repeated with box X11. Three originally noninfected rats were placed in box X11 with infected fleas. After two weeks in this box the rats were killed, fleas removed, and injected into guinea pigs. The brains and spleens from each of the rats were emulsified and injected separately into guinea pigs. From the guinea pigs injected with fleas and from

those injected with material from each rat, viruses were established which produced clinical endemic typhus in guinea pigs.

Rickettsiae have been found in guinea pigs infected with both the strain recovered from the fleas (see photomicrograph 454) and the strains established from the rat organs. Agglutinins for *B. proteus*

CHART 9

CROSS IMMUNITY TEST — DAILY TEMPERATURE RECORD



X_{19} (type O) have been produced in rabbits infected with one of the strains derived from these rats. (See Table 9.)

TABLE 9.—*Agglutination of B. proteus X_{19} (type O), by rabbit sera after inoculation with virus, rat X11*

Rabbit	Number of weeks after inoculation	Serum dilutions							
		1:10	1:20	1:40	1:80	1:160	1:320	1:640	1:1,280
3940A	0	0	0	0	0	0	0	0	0
	1	4	4	3	1	0	0	0	0
	2	4	4	4	4	4	3	0	0
3940B	0	4	2	0	0	0	0	0	0
	1	4	3	0	0	0	0	0	0
	2	4	4	4	3	0	0	0	0

It should be noted that routine blood cultures were made from all guinea pigs at the time material was taken for transfer. These cultures have been negative in the great majority of instances.

Repeated examination of the rats and the glass boxes used to house the experimental rats has failed to show the presence of any blood-sucking parasite other than the rat flea (*X. cheopis*).

Additional experimental work has shown that the typhus virus is present in the flea for at least nine days after feeding on infected rats. Typhus virus also has been recovered repeatedly from the feces of infected fleas.

BRAIN PATHOLOGY IN GUINEA PIGS

The lesions in endemic typhus are of the same general type as in European, or epidemic, typhus in guinea pigs, but are much less plentiful than in either the Wolbach or Breinl strains of European typhus. They consist of the well known small compact cellular glioses such as are seen in human and experimental epidemic (European) typhus and of various types of vascular reactions within the brain substance and of usually scanty, irregular, often perivascular cellular infiltrations in the pia, consisting chiefly of lymphocytes, rarely also macrophages, and sometimes associated with edema or fibroblast proliferation. The most frequent vascular lesion is an infiltration of the vessel sheath by lymphocytes, less often adventitia cell proliferation or perivascular hemorrhage are seen, rarely endothelial swelling or proliferation. Definite thrombosis or endothelial necrosis were not observed except for a single lesion in one of 20 guinea pigs infected with Maxcy's "H" strain (16). Lymphocyte infiltration of variable extent and density was seen in the chorioid plexi of one "H" strain animal, and of four guinea pigs of the Baltimore flea strain.

TABLE 10.—*Frequency, type, and distribution of brain lesions in guinea pigs (counted in 5 to 6 complete cross sections of the brain from the frontal, mid-parietal, mid-brain, cerebellopontine, and medullary levels)*

Strain	Maxcy "H" strain human, 1927	Experimental strains, rat and flea X-series	Baltimore and Savannah flea strains	"Wilmington" strain	European Breinl strain [1] (for comparison)
Total number of brains tabulated	20	24	19	40	1
Number showing meningeal reaction	(2)	21	18	(3)	1
Number showing focal glioses	(2)	12	7	18	1
Number showing intracerebral vascular lesions	(2)	11	6	15	1
Number showing lesions of both types	(2)	9	4	11	1
Number showing intracerebral lesions of either type	11	14	10	23	1
Total number of focal glioses recorded in all	(2)	48	37	(2)	76
Total number of vascular lesions recorded in all	(2)	28	35	(2)	101
Total number of both types in all	58	76	72	(2)	177
Cerebral cortex:					
Glioses	(2)	28	15	(2)	33
Vessels	(2)	10	11	(2)	36
Total	32	38	26	(2)	69

[1] No scrotal involvement. [2] Not recorded. [3] Not recorded except in 4.

Table 10.—*Frequency, type, and distribution of brain lesions in guinea pigs (counted in 5 to 6 complete cross sections of the brain from the frontal, mid-parietal, mid-brain, cerebellopontine, and medullary levels)*—Continued

Strain	Maxcy "H" strain human, 1927	Experimental strains, rat and flea X-series	Baltimore and Savannah flea strains	"Wilmington" strain	European Breinl strain [1] (for comparison)
Basal ganglia:					
Glioses	(2)	0	4	(2)	9
Vessels	(2)	1	6	(2)	14
Total	8	1	10	(2)	23
Thalamus					
Glioses	(2)	6	2	(2)	19
Vessels	(2)	2	2	(2)	27
Total	(2)	8	4	(2)	46
Mid-brain:					
Glioses	(2)	4	7	(2)	6
Vessels	(2)	2	4	(2)	6
Total	5	6	11	(2)	12
Cerebellum:					
Glioses	(2)	3	6	(2)	6
Vessels	(2)	3	4	(2)	14
Total	3	6	10	(2)	20
Pons:					
Glioses	(2)	2	2	(2)	3
Vessels	(2)	4	1	(2)	4
Total	9	6	3	(2)	7
Medulla:					
Glioses	(2)	5	1	(2)	0
Vessels	(2)	6	7	(2)	0
Total	1	11	8	(2)	0

[1] No scrotal involvement. [2] Not recorded.

The distribution and types of lesions in four strain groups of endemic typhus and proportion of brains showing such lesions are tabulated in Table 10. Similar data for a single guinea pig infected with the Breinl strain of European typhus are placed in this table for contrast as to the number of lesions present. The number of lesions counted in this brain, on comparable sections, is more than equal to the sum of those seen in each of three of the other groups. In regard to the topographic distribution, lesions were found to be most numerous in the cerebral cortex. A similar distribution has been noted in the Wolbach and Breinl strains of European typhus (unpublished data).

It should be noted that with one or two exceptions all of the guinea pigs included in Table 10 showed scrotal involvement, typical of endemic typhus, during the course of the disease.

SUMMARY

In conclusion it may be stated that the rat flea (*Xenopsylla cheopis*) as a vector of endemic typhus meets the requirements of the epidemiological evidence. The virus of endemic typhus has been recov-

PLATE I

PHOTOMICROGRAPH (NO 458) SHOWING MANY RICKETTSIAE IN CELL CYTOPLASM (X 1,430)

PHOTOMICROGRAPH (NO. 454) SHOWING CELL CYTOPLASM PACKED WITH RICKETTSIAE (X 1,430)

PHOTOMICROGRAPH (NO 456) SHOWING RUPTURED CELL WITH INCLUDED AND FREE RICKETTSIAE

ered repeatedly (four times by us; once by Kemp) from rat fleas taken at typhus foci, and, finally, experimental transmission of the virus from rat to rat by means of the rat flea (*X. cheopis*) has been carried out in the laboratory.

The foregoing evidence points to the rat flea (*X. cheopis*) as a common vector of endemic typhus from rat to rat and from rat to man.

REFERENCES

(1) Maxcy, K. F.: Pub. Health Rep., **41**:2967 (Dec. 24), 1926.
(2) Rumreich, A., Dyer, R. E., and Badger, L. F.: Pub. Health Rep., **46**:470 (Feb. 27), 1931.
(3) Nicolle, C., Comte, C., and Conseil, E.: Compt. rend. Acad. d. Sc., **149**:486, 1909.
(4) Goldberger, Jos., and Anderson, J. F.: Pub. Health Rep., **27**: 297 (Mar. 1), 1912.
(5) Castaneda, M. R., and Zinsser, H.: J. Exper. Med., **52**:661 (Nov.), 1930.
(6) Zinsser, H., and Castaneda, M. R.: J. Exper. Med., **54**:11 (July), 1931.
(7) Badger, L. F., Dyer, R. E., and Rumreich, A.: Pub. Health Rep., **46**:463 (Feb. 27), 1931.
(8) Dyer, R. E., Rumreich, A., and Badger, L. F.: Pub. Health Rep., **46**:334 (Feb. 13), 1931.
(9) Dyer, R. E., Rumreich, A., and Badger, L. F.: J. Am. Med. Assoc., **97**:589 (Aug. 29), 1931.
(10) Mooser, H., Castaneda, M. R., and Zinsser, H.: J. Am. Med. Assoc., **97**:231 (July 25), 1931.
(11) Kemp, H. A.: J. Am. Med. Assoc., **97**:775 (Sept. 12), 1931.
(12) Shelmire, B., and Dove, W. E.: J. Am. Med. Assoc., **96** 579 (Feb. 21), 1931.
(13) Mooser, H., Castaneda, M. R., and Zinsser, H.: J. Exper. Med., **54**:567 (Oct.), 1931.
(14) Dyer, R. E., Ceder, E. T., Rumreich, A., and Badger, L. F.: Pub. Health Rep., **46**:1869 (Aug. 7), 1931.
(15) Dyer, R. E., Ceder, E. T., Rumreich, A., and Badger, L. F.: Pub. Health Rep., **46** (Oct. 9), 1931.
(16) Maxcy, K. F.: Pub. Health Rep., **44**:589 (Mar. 15), 1929.

SICKNESS AMONG MALE INDUSTRIAL EMPLOYEES IN THE SECOND QUARTER OF 1931

By Dean K. Brundage, *Statistician, Office of Industrial Hygiene and Sanitation, United States Public Health Service*

The sickness incidence rate among a sample group of male wage earners, based on reports to the Public Health Service from industrial sick-benefit associations, was lower in the second quarter of 1931 than in the same quarter of 1930, which rate in turn was lower than that of the second quarter of 1929. The decrease in the frequency of sickness, exclusive of accidents, was 12 per cent from the 1930 to the 1931 period under consideration, and 11 per cent from 1929 to 1930. Thus two decreases virtually of the same magnitude have occurred since 1929.

These results were obtained from reports covering the same industrial establishments in 1931 as in 1930, and in 1929 from 23 of the 27 establishments reporting in the two most recent years. The population under observation in each of the three periods, and especially in the last two years was, therefore, much the same. The number of men included in the record was approximately 152,000 in 1931, 166,000 in 1930, and 164,000 in 1929.

The cases included were those which caused disability for eight consecutive calendar days or longer and for which sick benefits were paid. In the group of mutual-benefit associations under consideration all diseases are compensable with the exception of the venereal diseases, and in a few of the associations certain chronic pathological conditions contracted prior to the date of joining the organization.

The record applies to employed males only, but includes those working on part time. For persons indefinitely laid off, membership in the benefit association ordinarily is automatically terminated.

TABLE 1.—*Frequency of disability lasting eight calendar days or longer in the second quarter of 1931 compared with the same quarter of 1930 and 1929*

[Male morbidity experience of 27 industrial establishments which reported their cases to the United States Public Health Service during all three years [1]]

Diseases and disease groups which caused disability (numbers in parentheses are disease title numbers from the International List of Causes of Death, third revision, Paris, 1920)	Annual number of disabilities per 1,000 men in—		
	1931	1930	1929
Sickness and nonindustrial injuries [2]	85.2	94.9	104.8
Nonindustrial injuries	12.0	11.7	11.7
Sickness [2]	73.2	83.2	93.1
Respiratory diseases	25.3	31.4	35.7
Influenza, grippe (11)	9.7	12.0	12.2
Bronchitis, acute and chronic (99)	2.9	4.1	4.8
Pneumonia, all forms (100, 101)	1.9	2.4	3.2
Diseases of the pharynx and tonsils (109)	5.8	6.8	8.7
Tuberculosis of the respiratory system (31)	1.2	1.7	1.4
Other respiratory diseases (97, 98, 102–107)	3.8	4.4	5.4
Nonrespiratory diseases	47.9	51.8	57.4
Diseases of the stomach—cancer excepted (111, 112)	3.5	4.5	5.3
Diarrhea and enteritis (114)	.9	1.3	1.8
Appendicitis (117)	3.6	4.8	5.4
Hernia (118a)	1.9	1.4	2.1
Other digestive diseases (108, 110, 115, 116, 118b–127)	2.7	3.0	3.3
Rheumatic group, total	10.5	11.5	12.4
Rheumatism, acute and chronic (51, 52)	6.0	5.9	6.6
Diseases of the organs of locomotion (158)	3.0	3.6	3.5
Neuralgia, neuritis, sciatica (82)	1.5	2.0	2.3
Neurasthenia (part of 84)	1.5	1.3	1.4
Other diseases of the nervous system (70–81, 83, part of 84)	1.5	1.0	1.1
Diseases of the heart and arteries, and nephritis (87–92, 96, 128, 129)	3.7	3.4	4.2
Other genito-urinary diseases (130–136)	2.4	2.3	2.3
Diseases of the skin (151–154)	3.1	3.8	4.3
Epidemic and endemic diseases except influenza (1–10, 12–25)	2.9	3.7	3.2
Ill-defined and unknown causes (205)	2.1	2.1	2.6
All other diseases [2] (26–30, 32–37, 41–50, 53–69, 85, 86, 93–95, 155–157, 159, 164)	7.6	7.7	8.5
Average number of males covered in the record	151,813	165,791	164,108

[1] Except that the rates for 1929 cover 23 of the 27 establishments included in 1930 and 1931.
[2] Exclusive of disability from the venereal diseases.

Virtually all disease groups participated in the decline in incidence. Diseases of the respiratory system as a whole decreased 19 per cent in the second quarter of 1931 as compared with the same quarter of

1930, and 29 per cent when compared with the rate during the corresponding period of 1929. The reported frequency of influenza decreased about 20 per cent as compared with the same period of either of the two preceding years. The incidence of pneumonia (all forms) was lower by 21 per cent than in the second quarter of 1930, and by 41 per cent than in the same period of 1929. Decreases of similar magnitude were recorded for bronchitis, and for tonsillitis and other diseases of the tonsils and pharynx. Even for tuberculosis of the respiratory system the indicated frequency of new cases was lower in the 1931 period than in either of the two preceding second quarters. For all other respiratory diseases combined, the decrease was 14 per cent from the 1930 incidence and 30 per cent from that in 1929.

The rate for total nonrespiratory diseases, which seldom fluctuates to any marked extent, was 8 per cent lower in 1931 than in 1930 and 17 per cent below the 1929 frequency. Diseases showing the most marked decreases in this group include diseases of the stomach (exclusive of cancer), appendicitis, diseases of the skin, and the rheumatic group (rheumatism—acute and chronic, lumbago and other diseases of the organs of locomotion, and neuralgia, neuritis, sciatica).

For three disability categories, however, the 1931 rates were definitely above those of each of the two preceding periods. In one of these three groups, namely, nonindustrial injuries, a higher rate this year is to be expected, because, as fewer hours are spent in the factory, the time during which men are exposed to accidents outside the workshop, obviously, is increased. The other two disability categories showing increased incidence were (*a*) neurasthenia and (*b*) certain other diseases of the nervous system.

In the report for the first quarter of 1931 it was stated that the frequency of illnesses reported as neurasthenia was higher in 1921 than in any year since then, and that in view of the similarity of industrial conditions in 1921 and 1931 it appeared worth while to present the rates for this disease separately in Table 1.[1] The neurasthenia rate was not as high during the second quarter of this year as in 1921 (an annual rate of 1.5 cases per 1,000 men as compared with 2.5 in 1921), but it was somewhat higher than in the second quarter of 1930 and of 1929. (See Table 1.) For certain other diseases of the nervous system the increase this year was larger than that shown for neurasthenia. The incidence of this group was 1.5 in 1931, as compared with 1.0 in 1930, and 1.1 in 1929. Included in this group are the more serious mental cases, paresis, cerebral embolism, cerebral hemorrhage, meningitis, encephalitis, and certain other diseases of the nervous system (title numbers 70–81 and 83 in the International

[1] *Cf.* Sickness among Male Industrial Employees in the first quarter of 1931. Pub. Health Rep., vol. 46, No. 31 (July, 1931).

List of the Causes of Death, third revision, Paris, 1920). Unfortunately, the population under observation was not large enough to afford statistics of the trend of these diseases separately.

Although the morbidity rates presented cover a very small sample of the male wage-earning population of the country, they are consistent with certain other health indexes. For example, the Metropolitan Life Insurance Co. reports that the death rate among its approximately 19,000,000 industrial life-insurance policyholders in the United States and Canada was 8.9 per 1,000 in the second quarter of 1931, which was slightly better than the low for the second quarter of any preceding year (9.0 in 1921).[2] The company also reports a sharp drop in the mortality from tuberculosis during the second quarter in spite of severe unemployment, which usually tends to increase the tuberculosis death rate.[3]

COURT DECISION RELATING TO PUBLIC HEALTH

Conviction for sale of adulterated article reversed where statute made such sale compulsory.—(California Superior Court, Appellate Dept.; People *v.* Wolin, 2 P. (2d) 60; decided Aug. 3, 1931.) A statute made it unlawful to "sell or offer for sale, or keep for sale," any adulterated drug and so defined "drug" as to include fluid extract of ginger. It was also provided by the statute that any agent of the State board of health should have the right to purchase any drug suspected of being adulterated or to take samples thereof if a sale was refused, and refusal to sell such a sample to an agent was made a misdemeanor.

The defendant was convicted under a complaint which charged that he did "sell and offer for sale and hold out for sale and offer to deliver" adulterated fluid extract of ginger. The sale proved was one made to an agent of the State board of health, who announced his authority to the defendant and stated that he wished to take officially a sample of the ginger. The defendant thereupon delivered to the agent four bottles of the ginger for which the agent paid the defendant. On appeal by the defendant, the appellate court pointed out that there was no such offense as "holding out for sale" nor (except in case of imported drugs, which was not the charge in the instant case) any such offense as "offering to deliver." It stated that the conviction had to rest for support, therefore, on the charge of selling and offering for sale, but went on to say that no offer was shown by the evidence. The conviction for such sale was reversed because the court did not regard the transaction as violative of the statute. "We can not ascribe to the legislature," said the court,

[2] Statistical Bulletin, Metropolitan Life Insurance Co., vol. 12, No. 7 (July, 1931), p. 7.
[3] Ibid., p. 8.

"an intention to punish as a crime an act the refusal to do which is also made criminal; and yet an affirmance of this conviction must rest on such a construction of the statute."

DEATHS DURING WEEK ENDED SEPTEMBER 26, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended September 26, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended September 26, 1931	Corresponding week, 1930
Policies in force	74, 796, 694	75, 495, 053
Number of death claims	13, 063	12, 170
Death claims per 1,000 policies in force, annual rate	9. 1	8. 4
Death claims per 1,000 policies, first 39 weeks of year, annual rate	9. 8	9. 7

Deaths [1] from all causes in certain large cities of the United States during the week ended September 26, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Sept. 26, 1931				Corresponding week, 1930		Death rate [2] for the first 39 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	6, 701	9. 8	668	[4] 53	10. 5	791	12. 1	12. 0
Akron	34	6 9	7	69	8. 2	4	7. 8	7. 9
Albany [5]	32	12. 9	5	99	16 3	2	13. 9	15. 0
Atlanta	72	13. 5	4	41	12. 1	6	15. 2	15. 8
White	39		2	32		6		
Colored	33	(6)	2	57	(6)	0	(6)	(6)
Baltimore [5]	190	12. 2	18	61	11. 5	28	14. 6	14. 1
White	131		12	52		21		
Colored	59	(6)	6	94	(6)	7	(6)	(6)
Birmingham	46	8. 9	8	80	12. 4	7	13. 7	13. 8
White	17		4	69		3		
Colored	29	(6)	4	97	(6)	4	(6)	(6)
Boston	201	13. 3	25	71	12. 0	23	14. 3	14. 2
Bridgeport	29	10. 3	4	66	8 5	4	11. 3	11. 1
Buffalo	111	10 0	13	53	11 1	14	13 2	13. 1
Cambridge	19	8. 7	5	101	9 2	3	12. 2	11. 7
Camden	33	14. 5	7	122	13 2	1	14. 5	13. 7
Canton	11	5. 4	1	23	8. 4	4	10 2	10 1
Chicago [9]	559	8 4	61	54	10 2	64	10. 8	10. 5
Cincinnati	118	13. 5	10	60	17 1	12	16 2	15. 7
Cleveland	173	9. 9	14	41	9. 5	23	11. 3	11. 2
Columbus	48	8. 5	6	59	13 8	9	13 8	15. 7
Dallas	39	7. 5	5		8. 9	10	11. 3	11. 6
White	26		2			9		
Colored	13	(6)	3		(6)	1	(6)	(6)
Dayton	45	11. 3	3	42	12. 9	6	11. 9	10. 6
Denver	62	11 1	9	87	13. 9	13	14. 0	14. 9
Des Moines	29	10. 5	4	70	8. 8	6	11. 2	11. 8
Detroit	211	6. 7	35	56	7. 2	33	8. 4	9. 4
Duluth	25	12. 8	2	49	13. 4	2	11. 4	11. 3
El Paso	21	10. 4	3		13. 7	6	16. 0	17. 6
Erie	14	6. 2	2	37	7. 6	3	10. 7	11. 3
Fall River [5] [7]	12	5. 4	3	68	12. 2	8	11. 3	12. 1
Flint	16	5. 1	6	77	11. 6	11	7. 0	9. 3

Footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended September 26, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Sept. 26, 1931				Corresponding week, 1930		Death rate [2] for the first 39 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Fort Worth	29	9.0	4		9.2	1	10.9	11.1
White	26		4			1		
Colored	3	(6)	0		(6)	0	(6)	(6)
Grand Rapids	26	7.9	0	0	11.4	4	9.2	10.4
Houston	67	11.3	6		11.8	12	11.3	12.2
White	49		6			7		
Colored	18	(6)	0		(6)	5	(6)	(6)
Indianapolis	75	10.6	7	58	16.1	16	14.0	14.8
White	67		6	56		13		
Colored	8	(6)	1	67	(6)	3	(6)	(6)
Jersey City	51	8.3	1	9	7.4	4	11.7	11.3
Kansas City, Kans.	33	14.0	5	103	14.5	2	12.8	11.7
White	25		5	123		1		
Colored	8	(6)	0	0	(6)	1	(6)	(6)
Kansas City, Mo.	91	11.6	4	30	12.6	9	13.3	13.3
Knoxville	42	20.1	4	85	7.3	4	12.7	13.8
White	33		4	95		4		
Colored	9	(6)	0	0	(6)	0	(6)	(6)
Long Beach	29	9.9	2	48	6.9	4	9.8	9.9
Los Angeles	266	10.5	17	49	10.1	23	10.8	11.1
Louisville	89	15.1	11	94	11.3	6	14.5	13.7
White	69		10	98		4		
Colored	20	(6)	1	66	(6)	2	(6)	(6)
Lowell [7]	22	11.4	2	51	10.9	2	12.7	13.4
Lynn	17	8.6	1	26	4.6	0	9.7	10.5
Memphis	65	13.1	6	63	10.3	8	16.7	17.4
White	29		2	33		4		
Colored	36	(6)	4	116	(6)	4	(6)	(6)
Miami	32	14.8	6	152	8.0	0	11.9	11.2
White	22		3	106		0		
Colored	10	(6)	3	265	(6)	0	(6)	(6)
Milwaukee	83	7.3	12	52	9.1	11	9.4	9.7
Minneapolis	70	7.7	5	32	9.7	5	11.4	10.7
Nashville	50	16.8	15	223	16.9	6	17.1	16.7
White	33		9	179		4		
Colored	17	(6)	6	351	(6)	2	(6)	(6)
New Bedford [7]	19	8.8	1	27	12.5	5	12.1	10.9
New Haven	26	8.3	1	19	3.2	0	12.4	12.8
New Orleans	141	15.7	8	44	15.3	16	17.1	17.5
White	79		7	58		10		
Colored	62	(6)	1	16	(6)	6	(6)	(6)
New York	1,134	8.3	95	40	8.9	117	11.3	10.9
Bronx Borough	169	6.6	14	32	7.0	11	8.3	8.0
Brooklyn Borough	389	7.7	41	43	7.9	38	10.4	10.0
Manhattan Borough	420	12.1	26	44	13.3	51	17.2	16.2
Queens Borough	122	5.5	14	38	6.0	14	7.3	7.1
Richmond Borough	34	10.8	0	0	10.8	3	11.0	14.4
Newark, N. J.	80	9.4	11	58	10.1	11	11.8	12.1
Oakland	67	12.0	4	51	9.9	1	10.5	11.0
Oklahoma City	33	8.7	3	41	14.2	12	11.0	10.9
Omaha	37	8.9	2	22	8.3	5	14.0	13.6
Paterson	21	7.9	5	86	9.8	2	13.4	12.3
Peoria	26	12.5	4	105	11.4	2	12.7	12.6
Philadelphia	410	10.9	40	58	11.4	61	13.3	12.7
Pittsburgh	151	11.6	25	86	13.8	18	14.7	13.9
Portland, Oreg.	55	9.3	2	24	8.4	5	11.6	12.1
Providence	56	11.5	8	74	9.5	5	12.9	13.1
Richmond	44	12.4	2	29	11.1	4	15.8	15.0
White	25		1	22		2		
Colored	19	(6)	1	43	(6)	2	(6)	(6)
Rochester	65	10.2	2	18	10.8	4	12.0	11.6
St. Louis	193	12.2	17	57	12.9	25	15.5	14.3
St. Paul	45	8.5	2	21	7.7	4	10.8	10.1
Salt Lake City [5]	35	12.8	2	30	5.6	0	12.3	12.3
San Antonio	29	6.3	2		10.5	8	14.6	16.9
San Diego	26	8.7	4	81	13.9	1	13.6	14.5
San Francisco	148	11.9	9	60	13.5	8	13.1	13.1
Schenectady	18	9.8	5	20	10.9	1	10.6	11.4

Footnotes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended September 26, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930*—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Sept. 26, 1931				Corresponding week, 1930		Death rate [2] for the first 39 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Seattle	64	9.0	1	9	8.2	4	11.4	10.9
Somerville	14	6.9	1	37	7.5	1	9.1	9.8
South Bend	19	9.2	3	75	7.5	3	8.1	8.9
Spokane	36	16.1	1	26	10.8	1	12.5	12.3
Springfield, Mass	24	8.2	2	31	11.4	1	11.8	12.2
Syracuse	36	8.8	4	47	8.9	5	11.7	11.6
Tacoma	27	13.1	3	77	9.3	0	12.1	12.5
Toledo	50	8.8	1	9	13.2	2	12.0	12.7
Trenton	28	11.8	4	70	12.2	6	16.7	16.7
Utica	30	15.3	5	130	12.3	3	14.1	14.9
Washington, D. C	118	12.5	16	89	13.6	16	15.9	15.2
White	63	--------	6	49	--------	3	--------	--------
Colored	55	(6)	10	172	(6)	13	(6)	(6)
Waterbury	17	8.8	1	30	7.3	1	9.8	9.8
Wilmington, Del. [7]	15	7.3	1	22	19.1	5	14.1	14.5
Worcester	27	7.1	1	14	9.3	2	12.1	12.9
Yonkers	18	6.8	0	0	6.2	0	8.7	8.1
Youngstown	32	9.7	5	70	10.7	7	10.3	10.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended October 3, 1931, and October 4, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 3, 1931, and October 4, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 3, 1931	Week ended Oct. 4, 1930	Week ended Oct. 3, 1931	Week ended Oct. 4, 1930	Week ended Oct. 3, 1931	Week ended Oct. 4, 1930	Week ended Oct. 3, 1931	Week ended Oct. 4, 1930
New England States:								
Maine	3	2		1	31	8	0	0
New Hampshire	3	1			2		0	0
Vermont					9	1	0	0
Massachusetts	36	38	5	1	22	54	1	5
Rhode Island	8	4			4		2	1
Connecticut	2	7	3	8	2	2	0	2
Middle Atlantic States:								
New York	53	60	[1] 10	[1] 3	41	41	5	8
New Jersey	22	79	5	1	1	25	2	2
Pennsylvania	83	121			84	49	7	5
East North Central States:								
Ohio	116	48	2	2	22	12	0	3
Indiana	20	63	6	16	3	5	2	5
Illinois	70	118	1	18	15	34	4	9
Michigan	17	43	1		17	11	8	0
Wisconsin	8	1	12	10	16	36	1	3
West North Central States:								
Minnesota	21	17		1	4	1	2	3
Iowa	10	3			3		0	1
Missouri	49	30		1		34	1	3
North Dakota	5	3				18	1	0
South Dakota	13	5			8	1	0	0
Nebraska	14	10	1		2		0	2
Kansas	19	9			2	3	0	2
South Atlantic States:								
Delaware	3	1	3			4	0	0
Maryland [2]	40	11	2	1	1	4	0	0
District of Columbia	11	9				3	0	0
Virginia								
West Virginia [3]	58	21	13	5	23	17	0	0
North Carolina	130	129	9	5	8	5	0	1
South Carolina	32	38	188	187	5		0	0
Georgia [3]	61	22	9	20	6	23	0	1
Florida	16	4			17	2	0	0
East South Central States:								
Kentucky	144	28					1	7
Tennessee	103	36	13	2	2	7	1	0
Alabama [3]	110	43		22	8	22	1	1
Mississippi	146	40					0	1
West South Central States:								
Arkansas	47	3		5	1	1	0	0
Louisiana	32	24		4		3	1	0
Oklahoma [4]	70	41	1	8	1	8	0	0
Texas [3]	28	41	3	11	1	2	1	0
Mountain States:								
Montana	2	4			17		0	0
Idaho	6	1				7	0	0
Wyoming		1					0	0
Colorado	7	5			4	65	0	2
New Mexico	8	5			1		1	2
Arizona	3	6	3	2	2	12	0	1
Utah [2]	2		6	5	1	1	1	4
Pacific States:								
Washington	5	12			7	11	2	1
Oregon		2	18	15	4	45	0	1
California	43	39	15	31	54	67	4	1

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 13 cases: 1 case in West Virginia; 1 case in Georgia; 6 cases in Alabama; and 5 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 3, 1931, and October 4, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 3, 1931	Week ended Oct. 4, 1930	Week ended Oct. 3, 1931	Week ended Oct. 4, 1930	Week ended Oct. 3, 1931	Week ended Oct. 4, 1930	Week ended Oct. 3, 1931	Week ended Oct. 4, 1930
New England States:								
Maine	8	9	16	12	0	0	8	8
New Hampshire	22	1	10	0	0	0	0	2
Vermont	9	1	10	0	3	0	0	0
Massachusetts	112	38	103	67	0	0	4	8
Rhode Island	4	2	5	4	0	0	4	1
Connecticut	64	10	11	16	0	0	4	4
Middle Atlantic States:								
New York	275	50	104	100	0	0	39	86
New Jersey	52	3	44	47	0	0	20	12
Pennsylvania	50	15	167	151	0	0	93	43
East North Central States:								
Ohio	11	75	196	162	4	36	59	95
Indiana	6	17	35	72	7	18	18	20
Illinois	51	23	80	108	5	7	29	38
Michigan	112	20	69	90	1	2	16	27
Wisconsin	47	14	21	54	1	4	4	7
West North Central States:								
Minnesota	56	17	44	28	1	19	2	0
Iowa	13	25	14	36	11	12	3	4
Missouri	5	18	38	28	0	0	16	25
North Dakota	3	3	4	7	5	6	4	6
South Dakota	0	14	7	3	1	6	1	2
Nebraska	1	60	8	13	2	5	1	3
Kansas	0	87	35	38	0	2	14	11
South Atlantic States:								
Delaware	1	0	1	0	0	0	2	3
Maryland [2]	6	2	33	24	0	0	33	35
District of Columbia	4	0	6	4	0	0	0	4
Virginia	2							
West Virginia [3]	11	1	38	48	2	0	81	70
North Carolina	4	1	88	86	0	0	29	21
South Carolina	2	2	6	19	0	0	36	41
Georgia [3]	0	3	17	27	1	0	27	32
Florida	3	2	4	2	0	1	3	1
East South Central States:								
Kentucky	1	2	62	51	0	0	102	40
Tennessee	2	1	39	49	34	0	82	55
Alabama [3]	0	4	30	39	2	0	30	31
Mississippi	0	0	26	18	4	1	31	19
West South Central States:								
Arkansas	1	11	20	10	2	0	13	21
Louisiana	0	7	16	15	1	1	59	28
Oklahoma [4]	1	6	26	49	4	3	58	35
Texas [3]	1	8	14	24	0	17	53	20
Mountain States:								
Montana	4	2	4	13	0	0	4	8
Idaho	0	0	13	1	7	0	11	3
Wyoming	1	12	0	6	0	0	1	0
Colorado	0	5	14	16	0	3	9	8
New Mexico	1	2	1	6	0	0	13	14
Arizona	0	3	4	10	0	0	8	1
Utah [2]	0	0	3	11	0	0	0	7
Pacific States:								
Washington	5	3	28	33	0	22	4	11
Oregon	0	2	11	16	3	0	3	9
California	4	68	79	73	4	10	18	14

[2] Week ended Friday.
[3] Typhus fever, 1931, 13 cases: 1 case in West Virginia; 1 case in Georgia; 6 cases in Alabama; and 5 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August, 1931										
Massachusetts	7	132	8		179	3	433	290	0	35
Nevada			1				0		0	0
South Dakota	2	19	2		6		2	17	3	8
Wisconsin		44	42		151		173	61	4	13
September, 1931										
District of Columbia	3	35	3		3		4	23	0	11
Georgia	3	162	44	214	13	41	9	71	0	201
Nebraska	3	33	2		4		12	26	4	9
Tennessee	8	273	38	285	13	27	18	150	10	290

August, 1931

	Cases
Anthrax:	
Massachusetts	2
Chicken pox:	
Massachusetts	112
Nevada	1
South Dakota	29
Wisconsin	112
Dysentery:	
Massachusetts	3
German measles:	
Massachusetts	38
Wisconsin	13
Hookworm disease:	
Massachusetts	1
Lead poisoning:	
Massachusetts	1
Lethargic encephalitis:	
Massachusetts	4
Wisconsin	2
Mumps:	
Massachusetts	185
South Dakota	15
Wisconsin	216
Ophthalmia neonatorum:	
Massachusetts	126
South Dakota	1
Wisconsin	3
Septic sore throat:	
Massachusetts	25
Trachoma:	
Massachusetts	3
South Dakota	4
Tularæmia:	
Nevada	2
Undulant fever:	
Massachusetts	2
South Dakota	1
Wisconsin	5
Whooping cough:	
Massachusetts	557
Nevada	10
South Dakota	23
Wisconsin	600

September, 1931

Anthrax:	
Nebraska	1
Chicken pox:	
District of Columbia	1
Georgia	7
Nebraska	6
Tennessee	17
Dengue.	
Georgia	4
Dysentery:	
Georgia	11
Tennessee	10
Impetigo contagiosa:	
Tennessee	11
Lethargic encephalitis:	
Georgia	1
Nebraska	1
Tennessee	3
Mumps:	
Georgia	11
Nebraska	16
Tennessee	11
Paratyphoid fever:	
Georgia	2
Tennessee	3
Puerperal septicemia:	
Tennessee	1
Rabies in man:	
Georgia	1
Rocky Mountain spotted or tick fever:	
District of Columbia	1
Tennessee	1
Septic sore throat:	
Georgia	38
Nebraska	2
Tennessee	24
Tetanus:	
Tennessee	1
Trachoma:	
Tennessee	4
Typhus fever:	
Georgia	16
Undulant fever:	
Georgia	3
Whooping cough:	
District of Columbia	89
Georgia	17
Nebraska	30
Tennessee	79

Cases of Certain Communicable Diseases Reported for the Month of April, 1931, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	133	17	114	162	109	0	44	8	222
New Hampshire		8			12	0		2	
Vermont	79	1	13	98	30	2	20	0	97
Massachusetts	1,007	182	2,200	767	1,586	0	456	12	615
Rhode Island	71	25	178	393	314	0	56	3	42
Connecticut	346	33	2,914	292	231	0	146	5	266
New York	2,902	476	10,483	2,029	3,982	16	1,744	50	2,066
New Jersey	1,786	218	3,843	289	1,341	0	478	12	833
Pennsylvania	3,355	360	17,932	2,211	2,413	1	597	44	896
Ohio	2,146	194	3,504	2,511	1,989	288	765	22	591
Indiana	316	107	4,267	85	1,165	436	228	13	309
Illinois	1,532	494	7,259	1,312	2,296	245	707	27	735
Michigan	1,235	143	466	694	1,502	96	642	15	855
Wisconsin	1,590	51	2,806	3,778	626	28	144	6	445
Minnesota	735	50	466		369	25	288	5	177
Iowa	334	26	271	154	367	314	28	1	91
Missouri	317	121	2,036	157	1,407	213	251	7	160
North Dakota	117	19	233	104	84	31	20	6	44
South Dakota	134	34	476	14	129	104	26	1	44
Nebraska	352	37	24	628	144	139	14	1	78
Kansas	398	43	223	605	251	466	110	10	233
Delaware	25	7	1,036	122	158	0	25	1	8
Maryland	466	52	5,981	365	307	0	274	15	132
District of Columbia	107	60	1,325		105	0	99	1	31
Virginia	711	66	3,449		162	22		23	344
West Virginia	236	39	324		188	14	59	21	367
North Carolina	556	91	3,805		176	6		11	740
South Carolina	375	70	566	157	33	13	122	17	219
Georgia	241	22	471	127	315	25	99	7	57
Florida	273	28	1,040	42	23	4	49	16	121
Kentucky [1]									
Tennessee	263	38	1,409	143	383	103	157	32	143
Alabama	155	65	1,611	185	101	56	411	19	93
Mississippi	950	25	372	457	80	308	157	29	372
Arkansas	223	21	192	147	111	144	[2] 28	23	106
Louisiana	57	76	19	3	88	150	[2] 130	31	25
Oklahoma [3]	185	55	83	41	143	306	58	19	45
Texas		99			171			21	
Montana	227	10	93	111	139	14	82	5	135
Idaho	11	14	20	47	67	13	10	12	299
Wyoming	109	3	10	82	52	12	[2] 1	0	24
Colorado	348	25	790	243	138	12	77	3	285
New Mexico	172	8	232	96	27	7	46	9	105
Arizona	38	12	178	26	17	5	98	7	47
Utah [1]									
Nevada	13	2	89	11	4	0	[2] 7	0	28
Washington	527	30	413	273	177	180	168	15	562
Oregon	232	20	548	308	53	110	56	5	60
California	2,734	326	7,354	1,597	772	239	1,166	57	1,773

[1] Reports received weekly.
[2] Pulmonary.
[3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 100,000 Population (Annual Basis) for the Month of April, 1931

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	202	26	173	246	166	0	67	12	337
New Hampshire	....	21	....	....	31	....	....	5	....
Vermont	267	3	44	331	101	7	68	0	327
Massachusetts	285	52	623	217	449	0	129	3	174
Rhode Island	124	44	310	685	548	0	98	5	73
Connecticut	258	25	2,169	217	172	0	109	4	198
New York	275	45	992	192	377	2	165	5	196
New Jersey	524	64	1,127	85	393	0	140	4	244
Pennsylvania	419	45	2,239	276	301	0	75	5	112
Ohio	387	35	631	452	358	52	138	4	70
Indiana	117	40	1,585	32	433	162	85	5	115
Illinois	240	77	1,137	205	360	38	111	4	115
Michigan	301	35	114	169	367	23	157	4	209
Wisconsin	650	21	1,147	1,544	256	11	59	2	182
Minnesota	346	24	219	....	174	12	136	2	83
Iowa	164	13	133	76	180	154	14	0	45
Missouri	105	40	677	52	468	71	84	2	53
North Dakota	208	34	414	185	149	55	36	11	78
South Dakota	233	59	828	24	224	181	45	2	77
Nebraska	309	32	21	551	126	122	12	1	68
Kansas	256	28	143	389	161	209	71	6	150
Delaware	127	35	5,246	618	800	0	127	5	41
Maryland	343	38	4,400	269	226	0	202	11	97
District of Columbia	264	148	3,271	....	259	0	244	2	77
Virginia	355	33	1,723	....	81	11	....	11	172
West Virginia	163	27	224	....	130	10	41	15	253
North Carolina	208	34	1,427	....	66	2	....	4	277
South Carolina	261	49	395	109	23	9	85	12	153
Georgia	101	9	197	53	132	10	41	3	24
Florida	217	22	827	33	18	3	39	13	96
Kentucky [1]	....	....	....	....	....	....	....	....	....
Tennessee	121	17	647	66	176	47	72	15	66
Alabama	70	29	731	84	46	25	186	9	42
Mississippi	568	15	222	273	48	184	94	17	222
Arkansas	145	14	125	96	72	94	[2] 18	15	69
Louisiana	32	43	11	2	50	85	[2] 74	18	14
Oklahoma [3]	107	32	48	24	83	178	34	11	26
Texas	....	20	....	....	35	....	....	4	....
Montana	514	23	210	251	315	32	186	11	306
Idaho	30	38	54	128	183	35	27	33	814
Wyoming	578	16	53	435	276	64	[2] 5	0	127
Colorado	404	29	918	282	160	14	80	3	331
New Mexico	486	23	655	271	76	20	130	25	296
Arizona	103	33	483	71	46	14	266	19	128
Utah [1]	....	....	....	....	....	....	....	....	....
Nevada	171	26	1,168	144	52	0	[2] 92	0	867
Washington	404	23	316	209	136	138	129	11	430
Oregon	290	25	684	385	66	137	70	6	75
California	559	67	1,503	326	158	49	234	12	362

[1] Reports received weekly.
[2] Pulmonary.
[3] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 98 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,480,000. The estimated population of the 91 cities reporting deaths is more than 31,935,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended September 26, 1931, and September 27, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,482	1,058	----------
98 cities	291	355	520
Measles:			
45 States	461	446	----------
98 cities	98	113	----------
Meningococcus meningitis:			
46 States	65	66	----------
98 cities	20	25	----------
Poliomyelitis:			
46 States	1,095	596	----------
Scarlet fever:			
46 States	1,422	1,511	----------
98 cities	368	447	381
Smallpox:			
46 States	75	140	----------
98 cities	3	20	9
Typhoid fever:			
46 States	1,158	976	----------
98 cities	133	109	141
Deaths reported			
Influenza and pneumonia:			
91 cities	330	357	----------
Smallpox:			
91 cities	0	0	----------

City reports for week ended September 26, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	1	----------	0	0	2	0
New Hampshire:								
Concord	0	0	0	----------	0	0	0	0
Nashua	0	0	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Burlington	0	0	0	----------	0	0	0	0
Massachusetts:								
Boston	6	15	13	3	0	5	4	14
Fall River	0	2	1	----------	0	3	0	0
Springfield	0	2	0	----------	0	0	4	0
Worcester	1	3	1	----------	0	0	8	0
Rhode Island:								
Pawtucket	0	0	0	----------	0	0	0	1
Providence	0	3	0	----------	0	5	3	2
Connecticut:								
Bridgeport	0	3	0	----------	0	0	0	7
Hartford	0	2	0	----------	0	0	1	3
New Haven	1	1	0	----------	0	0	0	1

City reports for week ended September 26, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
MIDDLE ATLANTIC								
New York:								
Buffalo	1	8	3		0	1	1	8
New York	15	81	38	6	2	6	13	67
Rochester	1	2	0		0	0	0	1
Syracuse	0	1	0		0	0	0	2
New Jersey:								
Camden	0	2	2		0	0	0	4
Newark	1	9	0	1	0	1	1	
Trenton	0	1	0		0	2	2	4
Pennsylvania:								
Philadelphia	7	32	4	1	0	3	8	17
Pittsburgh	6	11	9		1	8	4	21
Reading	0	1	0		0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	4	5	7		0	0	0	6
Cleveland	8	27	3	2	1	6	20	6
Columbus	0	3	13	1	1	0	1	3
Toledo	5	4	0		0	1	0	0
Indiana:								
Fort Wayne	0	1	5		0	0	0	0
Indianapolis	4	6	1		0	0	9	2
South Bend	0	0	1		0	0	0	0
Terre Haute	1	0	1		0	0	0	0
Illinois:								
Chicago	9	58	29	3	2	15	12	25
Springfield	0	0	0		0	3	1	4
Michigan:								
Detroit	6	33	7	1	1	1	4	11
Flint	3	2	0		0	0	1	0
Grand Rapids	0	1	0		0	0	1	0
Wisconsin:								
Kenosha	0	1	0		0	0	5	0
Madison	1	0	2			0	5	
Milwaukee	8	5	2		0	0	14	5
Racine	1	1	0		0	0	3	0
Superior	0	0	0		0	1	0	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	3	0	0		0	0	1	0
Minneapolis	10	17	3		0	2	17	2
St. Paul	3	8	2		0	0	11	0
Iowa:								
Davenport	0	1	0			1	0	
Des Moines	0	1	1			0	0	
Sioux City	1	1	3			0	0	
Waterloo	3	1	3			0	0	
Missouri:								
Kansas City	1	3	5		0	0	0	6
St. Joseph	0	1	3		0	0	0	0
St. Louis	1	20	11			0	0	4
North Dakota:								
Fargo	0	0	0		0	0	0	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	7	0	0			4	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	0	7	7		0	0	1	3
Kansas:								
Topeka	1	1	0		0	0	2	0
Wichita	4	1	0		0	0	0	0
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	0	0		0	0	1	1
Maryland:								
Baltimore	4	15	9	3	0	1	2	6
Cumberland	0	0	0		0	0	0	0
Frederick	0	0	0		0	0	0	1

City reports for week ended September 26, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—continued								
District of Columbia:								
Washington	0	10	9	2	0	1	0	7
Virginia:								
Lynchburg	0	2	0		0	0	0	0
Norfolk	0	1	0		0	0	0	1
Richmond	0	14	1		0	0	0	1
Roanoke	0	3	1		0	0	0	1
West Virginia:								
Charleston	0	0	2	1	1	0	0	0
Wheeling	0	0	0		0	0	0	1
North Carolina:								
Raleigh	0	3	1		0	0	0	1
Wilmington	0	0	2		0	0	0	0
Winston-Salem	0	3	5		0	1	2	1
South Carolina:								
Charleston	0	0	0	5	0	0	0	1
Columbia	0	1	0		0	0	0	2
Greenville	0	1	1		0	0	0	0
Georgia:								
Atlanta	0	7	3	1	1	0	0	0
Brunswick	0	0	0		0	0	0	0
Savannah	0	0	1	2	0	1	2	3
Florida:								
Miami	0	2	0		0	0	1	1
Tampa	0	1	0		0	0	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		0	0	0	0
Tennessee:								
Memphis	0	3	7		0	0	0	0
Nashville	0	2	2		0	0	0	0
Alabama:								
Birmingham	0	3	4		0	0	0	4
Mobile	0	0	2		1	0	0	1
Montgomery	0	2	7			0	0	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	1			0	0	
Little Rock	0	0	1		0	1	0	2
Louisiana:								
New Orleans	0	8	13		0	0	0	5
Shreveport	0	0	1		0	0	0	0
Oklahoma:								
Muskogee	0	1	3		0	0	0	0
Oklahoma City	0	2	3		0	0	0	2
Tulsa	0	2	16			1	0	
Texas:								
Dallas	0	8	6		0	0	0	1
Fort Worth	0	1	1		0	0	0	3
Galveston	0	0	0		0	0	0	2
Houston	0	5	6		0	0	0	4
San Antonio	0	2	2		0	0	0	1
MOUNTAIN								
Montana:								
Billings	0	0	0		0	1	0	0
Great Falls	1	0	0		0	1	0	1
Helena	0	0	0		0	1	0	0
Missoula	1	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	0	0	2
Colorado:								
Denver	4	9	6		0	2	2	4
Pueblo	2	1	0		0	0	0	1
New Mexico:								
Albuquerque	0	0	0		0	0	0	0
Arizona:								
Phoenix	0	0	0		0	0	0	0

City reports for week ended September 26, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MOUNTAIN—contd.								
Utah:								
Salt Lake City	4	2	0	----------	0	0	0	0
Nevada:								
Reno	0	0	0	----------	0	0	0	0
PACIFIC								
Washington:								
Seattle	15	3	0	----------	----------	3	1	----------
Spokane	3	1	0	----------	----------	0	0	----------
Tacoma	1	2	1	----------	0	0	0	3
Oregon:								
Portland	4	5	1	----------	1	3	2	2
Salem	0	0	0	1	0	0	0	0
California:								
Los Angeles	5	19	17	15	0	6	10	24
Sacramento	2	1	2	----------	0	4	0	4
San Francisco	5	8	1	2	0	13	1	5

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	0	0	0	0	0	0	1	0	0	0	22
New Hampshire:											
Concord	0	0	0	0	0	1	0	0	0	0	7
Nashua	0	1	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	1
Burlington	0	0	0	0	0	0	0	0	0	0	8
Massachusetts:											
Boston	20	8	0	0	0	9	3	0	0	19	201
Fall River	1	2	0	0	0	1	1	0	0	1	12
Springfield	1	0	0	0	0	0	1	0	1	1	24
Worcester	4	6	0	0	0	2	0	0	0	9	27
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	15
Providence	2	6	0	0	0	4	2	1	0	2	56
Connecticut:											
Bridgeport	2	0	0	0	0	1	0	0	0	1	29
Hartford	1	0	0	0	0	0	1	0	0	6	37
New Haven	1	0	0	0	0	0	1	1	0	9	26
MIDDLE ATLANTIC											
New York:											
Buffalo	7	12	1	0	0	5	1	0	0	9	110
New York	31	26	0	0	0	77	35	25	1	216	1,134
Rochester	2	6	0	0	0	1	1	2	1	4	64
Syracuse	2	2	0	0	0	1	0	0	0	20	36
New Jersey:											
Camden	1	0	0	0	0	0	1	0	1	4	33
Newark	4	1	0	0	0	7	2	1	0	70	--------
Trenton	1	0	0	0	0	2	1	0	0	3	28
Pennsylvania:											
Philadelphia	23	40	0	0	0	32	9	6	1	131	410
Pittsburgh	13	13	0	0	0	6	3	1	0	39	151
Reading	0	0	0	0	0	0	0	0	0	0	27

City reports for week ended September 26, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	7	15	0	0	0	7	2	1	0	11	118
Cleveland	14	11	0	0	0	14	3	2	9	107	173
Columbus	3	4	0	0	0	3	1	3	0	0	48
Toledo	5	3	0	0	0	4	1	0	0	29	50
Indiana:											
Fort Wayne	1	0	0	0	0	0	0	0	0	0	20
Indianapolis	5	3	1	0	0	4	2	3	2	5	--------
South Bend	1	0	0	0	0	0	0	0	0	0	18
Terre Haute	0	0	0	0	0	1	1	2	0	0	22
Illinois:											
Chicago	39	32	0	0	0	43	6	3	0	148	559
Springfield	0	0	0	0	0	0	1	0	0	0	20
Michigan:											
Detroit	30	22	1	0	0	21	4	11	0	109	211
Flint	6	1	0	0	0	0	1	0	0	7	16
Grand Rapids	5	1	0	0	0	1	0	0	0	3	26
Wisconsin:											
Kenosha	1	2	0	0	0	0	0	0	0	3	7
Madison	1	0	0	0	--------	--------	0	0	--------	2	--------
Milwaukee	10	6	0	0	0	3	1	0	1	70	83
Racine	3	5	0	0	0	1	0	0	0	2	14
Superior	1	0	0	0	0	0	0	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	3	0	0	0	2	0	14	0	0	25
Minneapolis	17	10	0	1	0	3	1	1	0	6	70
St. Paul	9	10	0	0	0	2	2	0	0	4	49
Iowa:											
Davenport	0	0	0	0	--------	--------	0	0	--------	0	--------
Des Moines	3	0	0	0	--------	--------	0	0	--------	0	29
Sioux City	0	1	0	1	--------	--------	0	0	--------	1	--------
Waterloo	1	0	0	0	--------	--------	0	0	--------	1	--------
Missouri:											
Kansas City	4	2	0	0	0	6	1	1	0	13	91
St. Joseph	1	0	0	0	0	0	0	0	0	1	19
St. Louis	12	5	0	0	0	13	5	3	0	46	193
North Dakota:											
Fargo	0	2	0	0	0	0	0	0	0	1	--------
Grand Forks	0	0	0	0	--------	--------	0	0	--------	0	--------
South Dakota:											
Aberdeen	0	0	0	0	--------	--------	0	0	--------	3	--------
Sioux Falls	1	0	0	0	--------	--------	1	0	--------	0	6
Nebraska:											
Omaha	2	0	1	0	0	1	0	0	0	7	37
Kansas:											
Topeka	1	0	0	1	0	0	0	0	0	0	12
Wichita	2	1	0	0	0	0	0	0	0	0	16
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	1	0	0	0	0	1	0	0	0	15
Maryland:											
Baltimore	7	5	0	0	0	13	8	3	0	113	190
Cumberland	0	2	0	0	0	1	0	2	0	0	11
Frederick	0	0	0	0	0	0	0	0	0	1	2
District of Columbia:											
Washington	7	9	0	0	0	17	3	3	0	14	118
Virginia:											
Lynchburg	0	1	0	0	0	0	0	4	0	0	13
Norfolk	1	3	0	0	0	0	1	1	0	5	--------
Richmond	4	7	0	0	0	1	1	1	0	0	39
Roanoke	2	2	0	0	0	0	0	0	0	4	15
West Virginia:											
Charleston	2	0	0	0	0	1	1	1	0	1	13
Wheeling	1	0	0	0	0	0	0	0	0	0	17

City reports for week ended September 26, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
North Carolina:											
Raleigh	0	1	0	0	0	2	0	0	0	0	16
Wilmington	1	1	0	0	0	0	0	0	0	2	6
Winston-Salem	3	0	0	0	0	0	0	0	0	5	15
South Carolina.											
Charleston	0	0	0	0	0	1	2	0	0	0	15
Columbia	0	4	0	0	0	1	0	1	0	0	10
Greenville	0	0	0	0	0	0	0	0	0	0	--------
Georgia:											
Atlanta	6	1	0	0	0	7	2	4	0	0	78
Brunswick	0	0	0	0	0	0	0	1	1	0	2
Savannah	0	0	0	0	0	4	0	2	1	1	33
Florida:											
Miami	0	0	0	0	0	1	1	0	0	0	32
Tampa	0	0	0	0	0	0	0	0	0	0	17
EAST SOUTH CENTRAL											
Kentucky:											
Covington	0	0	0	0	0	0	0	0	0	0	16
Tennessee:											
Memphis	2	5	0	0	0	4	4	3	0	12	65
Nashville	1	2	0	0	0	3	4	0	0	1	50
Alabama:											
Birmingham	4	6	0	0	0	2	3	4	0	1	40
Mobile	0	1	0	0	0	1	1	0	0	0	17
Montgomery	0	2	0	0	------	------	0	1	------	2	------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	0	0	0	------	---	1	0	-	0	------
Little Rock	0	1	0	0	0	0	1	0	0	0	4
Louisiana:											
New Orleans	2	5	0	0	0	14	3	10	2	0	141
Shreveport	0	1	0	0	0	2	0	1	1	5	23
Oklahoma:											
Muskogee	0	2	0	0	0	0	0	1	0	0	------
Oklahoma City	2	4	0	0	0	0	3	0	1	0	33
Tulsa	2	3	0	0	------	------	1	3		0	--
Texas:											
Dallas	3	2	0	0	0	1	2	2	0	3	39
Fort Worth	2	3	0	0	0	1	1	4	0	0	29
Galveston	0	0	0	0	0	1	0	1	0	0	13
Houston	1	1	0	0	0	6	0	0	0	0	67
San Antonio	0	0	0	0	0	3	1	0	0	0	20
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	0	0	0	6
Great Falls	1	0	0	0	0	0	0	0	0	0	9
Helena	0	0	0	0	0	0	0	0	0	1	2
Missoula	1	1	0	0	0	0	0	1	0	0	4
Idaho:											
Boise	0	3	0	0	0	0	0	0	0	0	2
Colorado:											
Denver	5	8	0	0	0	3	2	1	0	7	56
Pueblo	0	0	0	0	0	0	0	1	0	2	10
New Mexico:											
Albuquerque	0	0	0	0	0	2	1	0	0	1	7
Arizona:											
Phoenix	1	0	0	0	0	4	0	0	0	0	-------
Utah:											
Salt Lake City	1	2	0	0	0	1	2	0	0	4	35
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	4

City reports for week ended September 26, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
PACIFIC											
Washington:											
Seattle	6	17	0	0	--------	------	0	0	--------	5	--------
Spokane	3	0	1	0	--------	------	0	0	--------	0	--------
Tacoma	1	0	1	0	0	2	0	0	0	0	27
Oregon:											
Portland	4	2	2	2	0	3	1	0	0	4	55
Salem	0	0	0	0	0	0	1	0	0	0	--------
California:											
Los Angeles	11	18	1	0	0	25	2	0	2	19	266
Sacramento	1	0	1	0	0	4	1	1	0	0	32
San Francisco	7	1	1	0	0	12	2	4	1	6	174

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	2	0
New Hampshire:									
Concord	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	1	1	0	0	0	0	4	44	5
Springfield	0	0	0	0	0	0	1	12	1
Worcester	0	0	0	0	0	0	0	2	1
Rhode Island:									
Providence	0	0	0	0	0	0	1	5	1
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	8	0
Hartford	0	0	0	0	0	0	0	8	2
New Haven	0	0	0	0	0	0	0	6	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	1	0	0	0	0	2	0	0
New York	4	3	1	0	0	0	14	177	21
Rochester	0	0	0	0	0	0	1	5	0
New Jersey:									
Newark	0	0	1	0	0	0	1	9	0
Trenton	0	0	0	0	0	0	0	2	0
Pennsylvania:									
Philadelphia	2	1	0	0	0	0	2	11	1
Pittsburgh	1	2	0	0	0	0	1	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	1	0	0	0	0	1	2	0
Cleveland	0	0	0	0	0	0	2	1	0
Toledo	0	0	0	0	0	0	0	0	1
Indiana:									
Fort Wayne	0	0	0	0	0	0	0	1	0
Indianapolis	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago	3	1	0	0	1	1	4	15	2
Springfield	0	1	0	0	0	0	1	1	0
Michigan:									
Detroit	1	1	1	0	0	0	4	19	1
Flint	0	0	0	0	0	0	0	2	0
Grand Rapids	0	0	0	0	0	0	0	3	0
Wisconsin:									
Madison	0	0	0	0	0	0	0	7	0
Milwaukee	0	0	0	0	0	0	1	2	1
Racine	0	0	0	0	0	0	0	1	0
Superior	0	0	0	0	0	0	0	1	0

City reports for week ended September 26, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	4	0
Minneapolis	0	0	0	0	0	0	1	9	1
St. Paul	0	0	0	0	0	0	1	26	2
Iowa:									
Des Moines	0	0	0	0	0	0	1	2	0
North Dakota:									
Fargo	2	0	0	0	0	0	1	1	0
Nebraska:									
Omaha	0	0	0	0	0	0	1	1	0
SOUTH ATLANTIC [1]									
Maryland:									
Baltimore [1]	0	0	1	1	0	0	1	1	0
Cumberland	0	0	0	0	0	0	0	1	0
District of Columbia:									
Washington	1	0	0	0	0	0	0	2	1
West Virginia:									
Wheeling	0	0	0	0	0	0	0	1	0
North Carolina:									
Winston-Salem	0	1	0	0	1	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	1	0	0	0	0
Georgia:									
Brunswick	0	0	0	0	0	1	0	0	0
Savannah [1]	0	0	0	0	2	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Nashville	0	1	0	0	0	0	0	0	0
Alabama: [1]									
Birmingham	0	0	0	0	1	1	0	0	0
Mobile	0	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	1	0	0	0	1	0	0	0
Louisiana:									
New Orleans	1	0	0	0	0	0	0	0	0
Texas:									
Houston	0	0	0	1	0	0	0	0	
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	1	1	0
Missoula	0	0	0	0	0	0	0	1	1
Utah:									
Salt Lake City	1	0	0	0	0	0	0	1	0
PACIFIC									
Washington:									
Seattle	0	0	0	0	0	0	0	1	0
Tacoma	0	0	0	0	0	0	1	1	0
California:									
Los Angeles	0	0	0	0	1	0	2	1	0
Sacramento	0	1	0	0	0	0	0	0	0
San Francisco	2	0	0	0	0	0	0	2	1

[1] Typhus fever, 6 cases: 1 case at Baltimore, Md.; 1 case at Savannah, Ga.; 2 cases at Tampa, Fla.; and 2 cases at Montgomery, Ala.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended September 26, 1931, compared with those for a like period ended September 27, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, August 23 to September 26, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

	Week ended—									
	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930
DIPHTHERIA CASE RATES										
98 cities	[2] 31	38	36	40	35	44	[3] 34	46	45	56
New England	41	53	55	39	58	60	36	34	38	56
Middle Atlantic	18	29	24	29	26	26	22	36	25	31
East North Central	[2] 33	45	38	48	32	63	29	74	42	74
West North Central	36	27	23	35	34	56	42	48	71	58
South Atlantic	63	64	34	66	45	68	73	46	67	100
East South Central	52	12	81	48	99	24	93	24	128	30
West South Central	34	66	105	56	41	45	[3] 52	63	101	136
Mountain	17	70	52	44	26	35	17	26	52	62
Pacific	24	16	27	32	29	22	29	12	41	26
MEASLES CASE RATES										
98 cities	[2] 22	20	19	24	14	16	[3] 22	16	15	18
New England	63	22	58	36	29	41	31	19	31	46
Middle Atlantic	13	22	14	27	8	19	18	16	9	13
East North Central	[2] 23	7	11	12	13	9	17	14	16	13
West North Central	8	27	8	31	11	15	13	19	4	29
South Atlantic	4	32	8	28	6	6	14	22	8	10
East South Central	6	12	6	24	6	6	0	0	0	66
West South Central	24	10	10	0	10	3	[3] 20	0	3	10
Mountain	52	35	52	53	35	35	122	44	44	26
Pacific	53	30	67	34	45	16	53	18	51	16
SCARLET FEVER CASE RATES										
98 cities	[2] 41	41	48	42	49	50	[3] 57	61	57	71
New England	46	56	87	60	106	56	87	77	53	87
Middle Atlantic	30	26	37	24	30	26	43	45	45	32
East North Central	[2] 43	47	56	47	64	84	62	90	62	117
West North Central	31	43	27	58	36	35	59	45	65	77
South Atlantic	30	72	51	72	55	56	71	44	67	62
East South Central	70	102	87	60	64	36	81	36	93	114
West South Central	64	14	54	63	41	24	[3] 52	52	34	52
Mountain	165	88	26	35	61	79	87	70	122	97
Pacific	39	26	43	28	39	63	55	67	71	75

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Terre Haute, Ind., not included.
[3] San Antonio, Tex., not included.

Summary of weekly reports from cities, August 23 to September 26, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930
98 cities	[2] 1	2	1	3	1	3	[3] 1	4	0	3
New England	0	0	0	0	2	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	[2] 0	0	4	2	2	2	1	9	0	2
West North Central	4	8	4	14	6	27	0	21	6	14
South Atlantic	4	0	0	4	0	0	0	0	0	0
East South Central	0	0	0	0	6	0	0	0	0	0
West South Central	0	3	0	0	0	0	[3] 0	0	0	3
Mountain	0	0	0	0	0	0	0	0	0	0
Pacific	4	10	2	12	0	8	4	4	0	16

TYPHOID FEVER CASE RATES

	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930
98 cities	[2] 22	24	20	21	23	26	[3] 42	22	21	17
New England	22	12	7	12	7	22	22	12	5	12
Middle Atlantic	20	20	13	20	13	24	16	15	16	13
East North Central	[2] 10	10	16	12	10	17	91	11	15	9
West North Central	13	19	6	14	13	21	38	29	36	15
South Atlantic	38	88	49	58	79	70	26	68	43	56
East South Central	47	42	41	48	35	48	47	48	47	18
West South Central	98	66	74	45	91	52	[3] 48	63	47	35
Mountain	9	44	44	9	35	62	26	0	26	44
Pacific	12	8	10	8	27	4	35	14	10	12

INFLUENZA DEATH RATES

	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930
91 cities	[2] 2	4	2	3	4	3	[3] 3	3	2	2
New England	0	0	2	0	2	0	2	2	0	2
Middle Atlantic	2	3	1	3	4	4	3	2	1	2
East North Central	[2] 1	4	1	2	3	3	3	2	3	2
West North Central	3	3	3	6	9	0	6	0	0	0
South Atlantic	6	8	2	8	2	2	4	0	4	4
East South Central	13	6	6	0	0	19	0	26	6	13
West South Central	0	7	10	11	17	0	[3] 0	7	0	4
Mountain	0	0	0	9	0	0	0	18	0	0
Pacific	2	2	2	0	2	0	2	0	0	5

PNEUMONIA DEATH RATES

	Aug. 29, 1931	Aug. 30, 1930	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930
91 cities	[2] 48	52	50	53	55	54	[3] 59	57	52	57
New England	46	51	24	56	58	63	50	56	67	39
Middle Atlantic	60	57	62	65	65	63	66	65	55	72
East North Central	[2] 26	50	33	36	36	43	45	42	38	47
West North Central	50	39	62	51	44	45	44	75	44	36
South Atlantic	69	60	61	68	63	58	57	56	51	56
East South Central	57	45	38	91	82	26	57	71	32	65
West South Central	59	36	83	50	73	57	[3] 82	46	52	71
Mountain	61	53	96	53	70	123	78	115	70	53
Pacific	29	45	19	27	46	25	84	40	86	40

[2] Terre Haute, Ind., not included.
[3] San Antonio, Tex., not included.

FOREIGN AND INSULAR

MENINGITIS ON VESSEL

The steamship "President Wilson."—The steamship *President Wilson* arrived at San Francisco October 6, 1931, from Honolulu (September 30), with a history of meningitis on board. A steerage passenger developed meningitis the day following disembarkation at Honolulu, and a Chinese cook of the steerage galley died of the disease on September 12. The vessel sailed from Manila September 12, Hong Kong September 15, Shanghai September 18, Kobe September 25, and Yokohama September 23.

Contacts were detained at San Francisco quarantine, and cultures were made.

CANADA

Provinces—Communicable diseases—Week ended September 19, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended September 19, 1931, as follows:

Province	Cerebro-spinal fever	Poliomy-elitis	Small-pox	Typhoid fever
Prince Edward Island [1]				
Nova Scotia		1		4
New Brunswick				10
Quebec	1	73		20
Ontario	2	13		20
Manitoba			1	8
Saskatchewan		1	5	8
Alberta		1		2
British Columbia		3		3
Total	3	92	6	75

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended September 19, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended September 19, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Poliomyelitis	73
Chicken pox	10	Puerperal fever	1
Diphtheria	31	Scarlet fever	31
Erysipelas	1	Tuberculosis	43
German measles	6	Typhoid fever	20
Measles	12	Whooping cough	25
Mumps	6		

CZECHOSLOVAKIA

Communicable diseases—July, 1931.—During the month of July, 1931, certain communicable diseases were reported in Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	15		Puerperal fever	44	15
Cerebrospinal meningitis	16	11	Scarlet fever	946	29
Diphtheria	1,077	51	Trachoma	232	
Dysentery	102	3	Typhoid fever	501	21
Malaria	68		Typhus fever	1	
Paratyphoid fever	25	1			

DENMARK

Communicable diseases—July, 1931.—During the month of July, 1931, cases of certain communicable diseases were reported in Denmark, as follows:

Disease	Cases	Disease	Cases
Anthrax	1	Mumps	210
Cerebrospinal meningitis	8	Paratyphoid fever	13
Chicken pox	5	Poliomyelitis	2
Diphtheria and croup	235	Puerperal fever	20
Erysipelas	212	Scabies	489
German measles	4	Scarlet fever	124
Gonorrhea	911	Syphilis	111
Influenza	2,228	Tetanus	4
Lethargic encephalitis	5	Undulant fever (Bac. abort. Bang)	46
Measles	2,146	Whooping cough	1,504

LATVIA

Communicable diseases—July, 1931.—During the month of July, 1931, cases of certain communicable diseases were reported in Latvia, as follows:

Disease	Cases	Disease	Cases
Botulism	2	Poliomyelitis	2
Cerebrospinal meningitis	6	Puerperal fever	15
Diphtheria	56	Scarlet fever	27
Erysipelas	35	Tetanus	3
Influenza	81	Trachoma	91
Lethargic encephalitis	1	Typhoid fever	103
Measles	23	Whooping cough	127
Mumps	28		

PORTO RICO

San Juan—Communicable diseases—Four weeks ended September 12, 1931.—During the four weeks ended September 12, 1931, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	4	Measles	11
Leprosy	1	Typhoid fever	1
Malaria	70	Wooping cough	9

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended—													
					July, 1931				August, 1931					September, 1931				Oct. 3, 1931
					4	11	18	25	1	8	15	22	29	5	12	19	26	
Ceylon: Colombo	C		1	1					1	1	1							
	D		1	1					1	1	1							
China.																		
Canton	C	1	2	1									1	1				
	D		1															
Shanghai	C					1				1	5	1	1	3	4	36		
Swatow	C			10	7													
Tientsin	C		1	10														
	D		1	1														
India	C	11,462	13,604	18,001	4,737	5,002	5,707	6,628	7,357	9,848								
	D	5,767	7,270	10,337	2,677	2,848	3,064	3,504	4,029	5,584								
Bombay	C	2				1	11	11	9	18	6	11	27	5	5			
	D	1					6	10	4	9	7	5	9	5	2			
Calcutta	C	310	265	292	72	62	55	48	42	27	20	21	10	3	15			
	D	176	149	168	35	34	58	28	10	7	7	6	4	2	3			
Karikal	C	19	12								1		1					
	D	14	7								1		1					
Madras	C	26	52	9	2	2			1		2	3	3	1	1			
	D	13	17	4														
Moulmein	C						1											
	D						1											
Negapatam	D												1					
Rangoon	C		2	4		1	2	1		1	1						1	
	D		1	2			1			1	1						1	
Vizagapatam	C			1														
India (French):																		
Chandernagor	C	6	4	3	1	1	1	2	1	4	2			1				
	D	5	4	3		1			1	4	2			1				
Pondicherry	C	24	17	3		1	1	1	1	1	1		2					
	D	4	7	3		1	1	1	1		1		1					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	Oct. 3, 1931
India (Portuguese)	C			1		2				1								
	D					1				1								
Indo-China (see also table below):																		
Cochin-China—Rachgia	C								P									
Pnompenh	C	2		1		1	4			1		1			1			
	D	1	2	1		1	1			1					1			
Saigon and Cholon	C	27	104	61	8	3	3											
	D	22	76	41	3	2	2											
Iraq:																		
Abulkhasib	C												6					
	D												5					
Amara	C											2	22	35	8	1		
	D											1	21	30	7	1		
Amara Province	C												6	11	103	73	32	21
	D												5	4	67	44	29	24
Basra	C								3	9	263	272	148		54	91	77	19
	D								2	8	140	137	76		30	48	34	11
Basra Province	C											5	14	6	10	23	26	14
	D											2	10	3	7	10	9	8
Diwaniyah	C																1	
Diwaniyah Province	C																15	8
	D																11	6
Iwaniyah	C																22	
	D																15	
Muntafiq Province	C												10	21	66	125	55	54
	D												8	20	42	75	38	57
Nasiriyah	C													22	50	16	4	4
	D													15	40	20	3	4
Suqelshuyukh	C												2					
	D												2					
Persia: Rafsanjan [1]	C		36															
	D		14															
Philippine Islands: [2] Provinces—																		
Capiz	C	29	17	4										9	9	17	49	21
	D	24	15	4										5	6	5	35	16

Cebu	C									1	1	1						
	D									1	1	1						
Iloilo	C			26	24	3												
	D			21	22	3												
Negros, Occidental	C			2														
	D			1														
Pampanga	C		1															
Siam	C	16	14	4	1	1		1				1	1					
	D	4	5	2		1							1					
Bangkok	C	3	3	1	1			3				1	1					
	D	2	1	1				2										
On vessel:																		
S. S. Arankola at Rangoon from Calcutta	C		1															
S. S. City of Eastborne at Calcutta from Cocanada	C			1														
S. S. Tairea, at Penang from Calcutta	C			1														
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C							1										
	D							1										
S. S. Kohistan, at Basra from Bushire, Persia	C							2										
S. S. Cathay at Kobe, Japan, from Shanghai	C											4						
	D											1						
S. S. Kasagi Maru, at Moji from Shanghai	C													1				
S. S. Ankoo, at Nagasaki from Shanghai	C														2			
	D														1			

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			Aug 1-10, 1931
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	
Indo-China (French) (see also table above):														
Cambodia [3]	C	125	100	113	33	44	40	83	96	129	72	82	87	12
	D	80	29	70	20	22	21	45	64				60	2
Cochin-China [3]	C	29	105	107	47	52	75	71	69		66	30	47	39
	D	18	73	74	36	40	57	52	54				42	32

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26
Algeria:																		
Algiers	C	1								2								
	D	1																
Bone	C				1													
Philippeville	C							1				1	1					
	D							1				1						
Argentina: San Juan Province	C							P	P									
Belgian Congo	C	2			1													
	D	2			1													
British East Africa (see also table below):																		
Tanganyika	C	8	18	46	17			6				8						
	D	1	21	30	10			6				2						
Uganda	C	19	35	138	298	95	132	98	53	71	53	69						
	D	19	32	126	286	94	129	96	90	71	93	63						
Ceylon. Colombo	C	8	4	3	2				1	4	1	1			1	1		
	D	7	3	3	2				1	4	1	1			1	1		
Plague-infected rats		4	1	5						1	3	4						
China:																		
Amoy [1]	C			1														
	D			1														
Changchuanpu	C																18	
Dutch East Indies.																		
Batavia and West Java	C	84	74	59	116	21	18	19	17	12	11	20	15					
	D	80	71	59	66	21	18	19	17	12	11	20	15					
East Java and Madura	C	4	1	1														
	D	4	1	1														
Java and Madura	D	277	243	176	192	59	55	52	66	38	53	67	47	58				
Egypt:																		
Alexandria	C	1			4	1	1	2	9	4	3	1	1	2	2		1	1
	D				4	1			4	1	2			1	1			
Assiout	C	13	32	18	11													
	D	6	17	7	1													
Beni-Suef	C		12	5														
	D		3	3														

Beheira	C									1		1			2			
Cairo	C	1																
Dakahlia	C							1			2							
Deirout	C		3	10	3													
	D		1	4	1													
Gharbieh	C				1													
	D				1													
Girga	C	86	44	7		1												
	D	24	22	2														
Kena	C	5	3	1														
	D	2	1	1														
Manfalut	C	17																
	D	3																
Minieh	C	3	1	6	3	10		2										
	D	2		3	1	2		1	1									
Port Said	C				3	1	1	2	1	2								
	D			1	2	1												
Tanta	C											2			1		1	
Hawaii Territory:																		
Hawaii—Hamakua—Plague-infected rats				1								1						
Maui Island—																		
Haliimaile—Plague-infected rats																	1	
Kula District	C										1							
	D										1							
Makawao—Plague-infected rats																	1	
India	C	9,139	6,142	752	88	30	29	78	84	164	175							
	D	7,037	5,199	692	51	15	13	42	58	91	117							
Bassein	C		1	1		1			3		1		1		1	2		
	D		1	1		1			2		1		1		1	2		
Bombay	C	4	11	8		1	1	11										
	D	3	11	6				6										
Plague-infected rats		70	137	94	37	11	16	9	12	8	13	17	9	23	17			
Burma	C							7	9									
	D							5	5									
Calcutta	C		2															
	D		2															
Madras Presidency	C	23	3	2	6	1	2	8	10					9	6	39		
	D	21	2	1	1		1	1	7					4	5	20		
Moulmein	C						1	1	7					P	5			
	D							1							4	3		
Rangoon	C	1	1	2	1			2		1				2				
	D	1	1	2	1			1		1				1				
Plague-infected rats		7	4	7	3	1	2	2	1	1		1	1	1	1	1	1	
Indo-China (see also table below): Pnompenh	C				3													
	D	6	4		2													
Iraq:																		
Baghdad	C	8	23	23	23	1	1	1				1			2	1		
	D	5	8	9	9	1		1							1			
Maudhan	C			2														
Madagascar (see also table below): Tamatave	C									1						2		

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26
Nigeria: Lagos	C		5															
	D		5															
Plague-infected rats			6															
Peru (see table below).																		
Senegal (see table below).																		
Siam	C	31	1	2	1													
	D	7	1	2	1													
Bangkok	C	20																
	D	6																
Nagara Rajsima	C	1																
Spain: Hospitalet—Barcelona Province	C												5	1			1	1
	D												2				1	
Syria. Beirut	C						1		1			1				1		
Tripolitania	C	1																
Tunisia: Tunis	C	10	16	16	11													
	D	4	8	3	1													
Union of South Africa:																		
Cape Province	C		3															
	D		3															
Plague-infected rats												1						
Orange Free State	C	6	2	2														
	D	1	2	2														

Place		Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931	Aug., 1931
British East Africa (see also table above):							
Kenya	C	7	345	245	154	484	197
Indo-China (see also table above)	C	4	11	------	2	1	------
	D	------	2	------	2	1	------
Madagascar (see also table above):							
Ambositra Province	C	70	30	19	15	1	------
	D	86	29	18	15	1	------
Antisirabe Province	C	83	48	7	12	13	------
	D	74	47	7	12	12	------
Miarinarivo Province	C	19	6	2	------	8	------
	D	19	6	2	------	7	------
Moramanga Province	C	1	------	2	1	1	------
	D	1	------	2	------	------	------
Tananarive Province	C	90	41	18	10	5	------
	D	81	40	18	9	5	------
Peru	C	8	8	2	5	2	------
	D	2	1	------	1	------	------
Senegal:							
Baol [1]	C	------	------	4	------	27	101
	D	------	------	3	------	13	58
Dakar [1]	C	------	2	63	64	95	194
	D	------	1	49	56	73	106
Louga [1]	C	14	1	5	4	3	2
	D	6	------	2	2	1	1
Rufisque [1]	C	------	------	1	2	34	2
Thies [1]	C	------	------	------	12	16	26
	D	------	------	------	3	7	16
Tivaouane [1]	C	------	4	19	3	3	------
	D	------	------	11	2	2	------

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26
Algeria:																		
Algiers	C	2	2	1	8			1										
Constantine	C	1		1		1									1			
Belgian Congo	C			47	42													
Bolivia.[1]																		
Brazil: Porto Alegre (alastrim)	C	19	53	19	5	9	10	9	13	11	6	17						
	D	1					1			1								
British East Africa: Tanganyika	C	8		13	7	37	83		20	1	18							
	D	3				7	5		5									
British South Africa:																		
Northern Rhodesia	C						21											
Southern Rhodesia	C				1		2											
Canada:																		
Alberta	C							1			1							
British Columbia	C								2	2			3		1	1		
Manitoba	C				4												1	
Winnipeg	C															1		
Nova Scotia	C		1															
Ontario	C		9	17	32	14	3	6	12	1		2	2	4		2		
Kingston	C	1	5												1			
Ottawa	C				1											1		5
Sault Ste. Marie	C		4	1														
Toronto	C	2	4	1	1													
Quebec	C					1												
Saskatchewan	C	[illegible]	16	45	51		13	10	19		10	6	10	[illegible]	[illegible]	12	5	
Regina	C	2	2	2														
Canary Islands: Las Palmas	C	1																
Chile:																		
Antofogasta	C					1												
Chanaral	C			1														
China:																		
Amoy	C	1	2	6	4	1	1			1						1		
	D	1	1	3	3	1	1			1						1		
Canton	C	7	4	3	1	1			1					1				
Foochow	C	P	P	P	P				P		P		P					
Hankow	C	3	3	5	4	1												

Hong Kong	C	2	3	1														
	D	2	1	2														
Manchuria—																		
Harbin (see also table below)	C	2		3														
Kwantung—Dairen	C	2	2	2	1													
Nanking	C	P	P	P														
Shanghai—																		
Foreigners only	C	6	17	7	11	2	1											
Including natives	D	10	18	7	13	2	1	2	1				1	1			1	
Swatow	D	26	2															
Tientsin	C			2			2	1										
Chosen (see table below).																		
Colombia:																		
Cali	D			1														
Santa Marta	D															1		
Dutch East Indies:																		
Batavia and West Java	C	1		2														
East Java and Madura	C			1														
Eritrea	C			3					2					10				
	D													2				
Finland	C		1															
France (see table below).																		
Great Britain:																		
England and Wales	C	705	744	570	287	56	45	50	36	26	25	19	21	33		19		
Bradford	C	2	6	8	5													
Leeds	C	1	2	2														
London	C	147	227	183	122	21	9	12	12	6	12	4	4	3	9	5		
London and Great Towns	C	544	558	403	228	53	33	34	32	22	20	17	10	13	30	11		
	D		2		1	1												
Sheffield	C	10	7													1		
Greece (see table below).																		
Honduras:																		
Tegucigalpa	C		1															
Tela	C		1															
India	C	11,791	14,265	11,403	7,313	1,492	1,376	1,236	1,255	978	904							
	D	2,251	2,923	1,849	1,704	404	363	292	293	234	213							
Bassein	C			1														
Bombay	C	10	8	9	6		1	3	2	1		1			1			
	D	4	5	4	5		1	3	2	1					1			
Calcutta	C	352	287	89	47	11	6	2	2	4	4		5	2	1	2		
	D	203	224	75	41	9	4	3	2		4		5	2	1	2		
Cochin	C	46	39	3							1	1	1					
Karachi	C	4	6		2					1								
	D	2			1													
Madras	C	22	19	8	2		2			1					1			
	D	3	5	6	1													
Negapatam	C		3		3			1			2			3		1		
Rangoon	C	3	11	13	6	2		1		2		1	1	1		1		
	D	1	1	5	2	1				1			1			1		
Vizagapatam	C	2	10	6	6	2		2	1		3		2	3	1	1		
	D	1	2	1	2	1					3		1	3	1	1		

[1] An epidemic of smallpox was reported on May 18 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths, P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931				August, 1931					September, 1931			
						4	11	18	25	1	8	15	22	29	5	12	19	26
India (French):																		
Chandernagor	C	14	10	7	1	2		1										
	D	2	7	5		2												
Karikal	C	3	4	4	6	1	1	1	1	1	1	3	2		2			
	D		3	4	6	1	1	1	1	1	1	2	2		2			
Pondicherry Province	C	14	6	11	7	4	1		23	11			3	1	6	1		
	D	14	9	11	7	4	1		23	11			3	1	6	1		
India (Portuguese)	C	8	21	3														
	D	3	6	1														
Indo-China (see also table below):																		
Pnompenh	C	1		1	2													
	D			1														
Saigon and Cholon	C	8	1	2		1			2	1	1			1		3		
	D	8	1	1		1				1				1		2		
Iraq:																		
Baghdad	C		2	3	1											1		
	D			2														
Basra	C			2	1													
Mosul Liwa	C							1					1					5
Ivory Coast (see table below):																		
Japan: Nagoya	C							1										
Mexico (see also table below)																		
Jalisco (State)—Guadalajara	D	1	1	2	1	1	1		1			2						1
Mexico City and surrounding territory	C	33	43	45	25	12	5	1	1	8	2			2	2	1		
	D	22	14	11	13	4	3	1		1	1					1		
Monterrey	C				1													
Torreon	C		1	1	3										1	1		
	D		2		2											1		
Vera Cruz	C	2	2	1														
Morocco (see table below).																		
Nigeria: Lagos	C	2																
Poland	C			3	3		17		1									
Portugal: Lisbon	C	52	56	67	48	15	12	18		17	12	8		10	21	18	17	
Rumania (see table below).																		
Siam	C		1	6	5		1											
	D			1	1			1										

Spain	C	P						7										
Straits Settlements	C	4	10	2								1						
	D	1	5	2														
Sudan (Anglo-Egyptian)	C	8	3	6	1												32	
	D	2		2													6	
Sudan (French) (see table below).																		
Syria (see table below).																		
Tunisia: Tunis	C	4																
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P														
Natal	C																P	
Orange Free State	C	P	P	P	P	P	P	P					P					
Transvaal	C	P			P	P	P	P										
Upper Volta	C	3	3	88	12	1		1										
	D	1		1														
On vessel:																		
S. S. Rotterdam at Naples from Venice	C	1																
S. S. Clan McTavish at Manila from Chittagong	C		1															
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C		1											1				
S. S. Talodi at Suakin	C			1														

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
China: Harbin (see also table above)	C			7		13	10	
Chosen	C	1		11		1	4	2
	D	1		3				1
France	C	4	16	15	6	54	9	
Greece	C		4			3	1	
Mexico (see also table above)	D		3		1	1	2	
Morocco	C		4	6	7	49	48	23

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Rumania	C			1		1		
Turkey	C	63	37	1		9	1	
	D	7	6					
Union of Socialist Soviet Republics	C				1,516	1,345		
Territories in Asia	C	194	532					
Ukraine	C	44	23					
Other territories in Europe	C	896	1,577					
Railroads, etc	C	43	77					

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			August, 1931		
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31
Indo-China (see also table above)	C	168	264	142		17	41	30	16	1	1		7	29		
	D	35	82								1		4	11		
Ivory Coast	C															7
Sudan (French)	C		4													
Syria: Beirut	C								1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26
Algeria:																		
Algiers	C	3	3	7	9			2										
Bone	C											1	1					
Constantine Department	C	3	9	22	26	2		1		3							2	
Oran	C		1	2	2						1					1		
Australia, Western	C	1	1	1														
Bulgaria	C	9	30	16	30									1				
	D	2	3	4	6													
China:																		
Canton	C	1																
Manchuria—Harbin	C	3	8		16													
Shanghai	C							1										
Tientsin	C		2															
Chosen (see table below).																		
Colombia: Cali	D														1			
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C		1		3												1	
Beheira Province	C		4															
	D		2															
Cairo	C													1				
Eritrea: Asmara	C	1																
Great Britain: Scotland—Fife County	C			1														
Greece (see table below).																		
Guatemala (see table below).																		
Iraq: Baghdad	C	2		2														
	D			2														
Irish Free State:																		
Cork County—																		
Schull	C						1											
Skibbereen	C				2	1												
Kerry County—																		
Dingle	C			1														
Listowel	C				1													

Kildare County—Naas	C																	
Limerick County—																		
Glin	C															2		
Limerick	C					2				1								
Michelstown	C					1												
Mayo County—																		
Belmullet	C			1														
Castlebar	C												1					
Westport	C												1					
Japan	C				1													
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D								1									
Mexico City, including municipalities in Federal District	C	216	170	75	46	28	9	7	9	7	6		5	5	1	2		
	D	84	56	33	19	4	3	2	3	5	3		2	1	1			
San Luis Potosi	C	5	3	2			1	3					1					
Torreon	C								1									
	D								1									
Morocco	C	7	13	42	101	37	20	24	21		2	1	5					
	D		1	4	6	4	4											
Palestine	C	5	5	4	5	2				3	3	1	4				4	
Panama Canal Zone—Balboa	C			2														
Paraguay: Asuncion	D	1																
Poland	C	287	538	298	97	9	17	13	14	10	4	10	7	6	2			
	D	15	23	18	4	2	1	1	1	1		1						
Rumania	C	214	70	169	80	2	2	7		7	9	4						
	D	16	8	18	13	2	2	1			1							
Syria	C			4														
Tunisia:																		
Sbeitla, vicinity of	C	20	12															
	D	7																
Sfax	C	2																
Tunis	C	14	13	29	73	1			1					1				
	D			3	4													
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below).																		
Union of South Africa:																		
Cape Province	C	1	P	P	P	P	P	P	P		P	P						
Municipality of East London	C	P			1					1								
Natal	C	1	P	P	P			P	P		P							
Orange Free State	C	P	P	P	P	P	P	12	P									
Transvaal	C	P	P	P	P	P	P	P	P		P	P	P					
Yugoslavia (see table below).																		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Chosen: Seoul	C	124	3	4		6	1
	D	8		1		1	1
Czechoslovakia	C	26		5	11	2	
Greece	C	17	8	22	6	9	1
	D	2	1	3			
Guatemala	C					33	34
	D					15	5
Latvia	C	12					
Lithuania	C	3	99	34	10	13	8
	D	1	3	5		2	
Mexico (see also table above)	D	83					
Turkey	C	18	15		3	3	2
Union of Socialist Soviet Republics	C			1,513	1,324		
Territories in Asia	C	260					
Ukraine	C	419					
Other territories in Europe	C	1,373					
Railroads, etc	C	158					
Yugoslavia	C	12	10	43	14	2	3
	D		1	5			

YELLOW FEVER

Place		Mar. 8–Apr. 4, 1931	Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26
Brazil:																		
Alagoas State	C											1						
	D											1						
Bahia State	C	1																
Ceara State	C	2	2	1	1								1					
	D		2	1									1					
Minas Geraes State	C	2	5	2														
	D	1	2	1														
Rio de Janeiro State	C	2		2														
	D	2																
Cambucy	C	1																
Sergipe State	C				1													
British Cameroons: Mamfe	C			3	2													
	D			2														

Colombia—Magdalena Province—Near Cienaga	C							4										
Gold Coast:																		
Akuse	C					2												
	D					1												
Dagomba District	C									2								
Kintampo	C							1										
	D							1										
Oda	C																1	
	D																1	
Tamale	C						2											2
	D						2											2
Wale Wale	C									1								
	D									1								
Ivory Coast:																		
Bobo Dioulasso	C						1											
	D						1											
Grand Bassam	C									4							1	
	D									2							1	
Kong Circle	C							4										
Seguela	C												P					
Nigeria: Abakaliki	C											1						
	D											1						
Senegal:																		
Podor (Hinterland)	C												1					
	D												1					
Saint Louis	C																	1
Thies	C																	1
	D																	1
Sudan (French)	C							4	P									
Togo: Seva	C																1	
Upper Volta:																		
Banfora	C								2									
	D								1									
Diarabakoko	C																	2
	D																	1
Ouagadougou	C												1					1

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THE EFFECT OF HEMOLYTIC STREPTOCOCCI AND THEIR PRODUCTS ON LEUCOCYTES

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Knowledge of the nature of the injury done to the tissues and wandering cells of the host by invading organisms and their products is fundamental to progress in the treatment of infectious diseases. The injury that may be done by hemolytic streptococci to the leucocytes, which are much concerned in the combat between host and invading bacteria, is the subject of the investigation here reported.

REVIEW OF LITERATURE

In the literature on infectious diseases there are many references to a decline in phagocytic activity against the specific infecting organism in fatal cases. In most of the investigations no inquiry was made to determine which of the two chief factors involved was at fault—antibody content or leucocytic efficiency; and those who have ascribed a decrease of phagocytic activity to injury of the leucocytes have generally not determined what factor in the bacterial product was responsible for the injury.

Cross found no decrease in phagocytic activity against any bacteria not concerned in the primary infection, even in the late stages of fatal disease. His results, suggesting that the nonspecific factor, the leucocytic efficiency, is not at fault in fatal cases, are at variance with the results of other investigators who have shown that streptococci and staphylococci disintegrate leucocytes.

As long ago as 1894 Van de Velde found a substance capable of disintegrating leucocytes in the exudate obtained by injecting staphylococci into the pleural cavity of rabbits. He found that this substance was destroyed at about 58° C. From this fact he concluded that it was albuminous. He gave it the name "leucocidin." He was able to demonstrate the action of leucocidin in test tube experiments as well as *in vivo*. Later Neisser and Wechsberg studied the staphylococcal leucocidin and concluded it was not the same as hemolysin, because the two toxic substances did not appear and disappear under the same conditions.

The following review of the literature on the production of substances harmful to leucocytes by streptococci reveals uncertainty and misunderstanding. No definite facts comparable to the facts known about staphylococcal leucocidin are established.

M'Leod (1915) reported that, in streptococcal septicemia accompanied by marked hemolysis, the protoplasm of the leucocytes is completely disintegrated. He was unable, however, to show the action of the leucocidic substance *in vitro* with filtrates of streptococcus cultures. Many years later he returned to the problem, and reported (Channon and M'Leod, 1929) that, if the filtrate from a young streptococcus culture were concentrated to one-fourth of its original volume, a toxic substance capable of disintegrating leucocytes could be demonstrated in the concentrate.

Channon and M'Leod call attention to the fact that no evidence has been obtained to show that the cytolytic effects of streptococci on red cells and leucocytes are due to different toxic substances.

Levaditi (1918) reported that he found incontestable proof that streptococci as well as staphylococci possess the power of destroying white cells *in vitro*. He was unable, however, to demonstrate leucocidic substance in filtrates of young or old cultures, or in extracts of dead microbes, or in macerated living streptococci. He concluded, therefore, thats treptococcal leucocidic substance is connected with the vitality of the microbes and is active only when they come in contact with leucocytes.

Nakayama (1920) believed that he could demonstrate a leucocidic substance in streptococcus culture filtrates. He used two tests for the vitality of the leucocytes: (1) The observation of ameboid movements; (2) the bioscopic tests devised by Neisser and Wechsberg to demonstrate staphylococcal leucocidin. In this test the capacity of the leucocytes for the reduction of methylene blue is taken as a measure of their vitality. Nakayama's results are confused by the use of glucose in the culture medium. It will be pointed out further on that acids are toxic for leucocytes. Hence carbohydrates, from which streptococci produce acids, should be excluded from experiments planned to demonstrate a toxic substance of the nature of that described by Van de Velde.

Using the bioscopic test of Neisser and Wechsberg for testing the vitality of cells, Dold (1930) reported that the streptococcal toxins in culture filtrates destroy not only leucocytes but also other tissue cells. Not all strains of hemolytic streptococci were found to produce the toxic substance, however, and a given strain sometimes would, and at other times would not, show evidence of its production.

Among the later writers on the subject, Wright and his collaborators (Wright, Colebrook, and Storer; Colebrook; and Hare) have reported experiments in which the phagocytic capacity of leucocytes from patients' blood was tested. They found that in septic infections the efficiency of the leucocytes is definitely subnormal when tested in normal serum, and that this efficiency appears to be reduced for all microbes indiscriminately.

No data could be found in the literature which would show whether or not the streptococcal toxin capable of producing a characteristic skin reaction (referred to hereafter in this paper as skin toxin) is toxic for leucocytes. Because many investigators have reported that there is no relationship between toxin production and virulence, it is generally inferred that the skin toxin does not affect leucocytes. That not all investigators accept that point of view, however, is illustrated by the following excerpt from Downie's recent paper: "From a histological study of the lesions it would appear that toxin acts by preventing phagocytosis so that the organisms can establish themselves and produce sufficient toxin to cause death of the animal. * * * The marked leucocytic accumulation at the site of intradermal injection in the toxin-immunized, as compared with the absence of such reaction in the coccus-immunized rabbits, is further evidence of the antiphagocytic action of toxin."

In 1922 the writer reported the sensitiveness of leucocytes to acids. Hydrochloric acid was found to be toxic in weak dilutions. Lactic acid caused more injury than hydrochloric, and acetic and butyric more than lactic, when all the acids were of the same H ion concentration. The effect of the acids on the leucocytes was cumulative. If the leucocytes were washed several times with an acid solution too weak to cause injury by a single washing, they absorbed the acid from the solution in each washing until finally enough had been absorbed to incapacitate them for phagocytosis.

Since many pathogenic bacteria, including streptococci, are vigorous producers of acids, and since the acids have been shown to be injurious to leucocytes, they must be considered as one of the possible agents which may incapacitate the leucocytes during the progress of a disease caused by acid-producing bacteria.

All the literature on streptococci that has been reviewed may be summed up as follows:

1. Streptococci destroy the phagocytic capacity of leucocytes.
2. No data were found which would show the effect of the skin toxin on leucocytes.
3. Although streptococci produce acids which have been shown to be toxic for leucocytes, acids have not been considered as one of the toxic substances which may incapacitate leucocytes *in vivo;* and some investigators have complicated their experiments planned to show a thermolabile leucocidic substance by failing to eliminate acids from their medium.
4. Whether or not streptococcal leucocidic substance is identical with hemolysin remains an open question.

EXPERIMENTAL WORK

In this study three methods were used to demonstrate the injurious effects of streptococci and their products on leucocytes: (1) The capacity of the treated leucocytes to ingest sensitized bacteria was determined by a modified Neufeld's technique; (2) disintegration of the treated leucocytes was observed in microscopic preparations; (3) the vitality of the treated leucocytes was determined by testing their capacity for the reduction of methylene blue (the bioscopic test of Neisser and Wechsberg).

THE PHAGOCYTIC TEST

A modified Neufeld's technique, the same as that used in the earlier study on the toxic effect of acids on leucocytes, was employed.

The fluid for the dilution of serum, for the dilution of test substances, and for the suspension of leucocytes in control tests was prepared by the addition of 1 part of Sorensen's phosphate buffer mixture adjusted to pH 7.0 to 9 parts of a 0.9 per cent sodium chloride solution. (It was found in the earlier study that a buffered solution was necessary for the protection of the leucocytes against chance contact with unfavorably acid solutions.)

H ion determinations were made with the use of standard buffer solutions and dye indicators.

A strain of hemolytic streptococcus originally cultivated from a case of erysipelas was used as "food" for the leucocytes and for the preparation of an immune serum for its sensitization. The serum was prepared by injecting a rabbit repeatedly with increasing doses of an antigen killed with formalin and thoroughly washed. It was preserved with 0.2 per cent tricresol. It had been kept in a refrigerator for about five months when these tests were made. It had a bacteriotropin[1] titer of approximately 1:1280. The experiments were all carried out in triplicate, in low dilutions of the serum, as indicated in the protocols.

Two-tenths of a cubic centimeter of diluted serum and an equal quantity of a 24-hour broth culture of the streptococcus were placed together in 1 by 7 centimeter reagent tubes and incubated in a 37° C. water bath for 45 minutes. During the incubation the leucocyte suspensions were prepared.

Rabbit leucocytes were used. They were obtained by injecting into each pleural cavity about 5 cubic centimeters of sterile aleuronat[2] suspension on the day preceding the test.

All solutions in which the leucocytes were to be suspended were warmed to 37° C. The exudate was taken up in a solution of 1 per

[1] The bacteriotropins are called "stable opsonins" by some writers.

[2] The aleuronat suspension was made by adding 3 per cent starch and 5 per cent aleuronat to ordinary broth.

cent sodium citrate in physiological saline solution. About 50 cubic centimeters of the citrate solution was used for washing each pleural cavity. If the exudate was very bloody, the first fractions of the bloody washings were discarded and the later fractions were usually found to be sufficiently free from red blood corpuscles to be used in the test. Usually small particles of aleuronat or small clots of fibrin or blood were washed out with the exudate. They sank to the bottom of the container and were disposed of by decanting the supernatant suspension into a fresh container, mixing the leucocytes from the two pleural cavities.

A 12-cubic centimeter portion of the leucocyte suspension was placed in each of as many centrifuge tubes as there were substances to be tested. The suspensions were centrifugated for four minutes at such a speed that the majority of leucocytes were thrown to the bottom of the tube, leaving a slightly clouded supernatant fluid (the cloudiness indicating that the leucocytes had not been subjected to a compression great enough to injure them). The supernatant fluid was poured away and the sediment was emulsified in 12 cubic centimeters of buffered saline solution or test material according to the plan of the experiment. (In the protocols this is called the "second washing.") The suspension was centrifugated again in the same manner as before. This sediment was carefully emulsified in 1.5 cubic centimeters of the test or control solution and the leucocytes were then ready for the test.

Two-tenths of a cubic centimeter of leucocyte suspension was added to each tube of sensitized bacteria. The tubes were shaken to obtain a uniform suspension, and then were returned to the water bath for further incubation. During this second incubation period the racks containing the tubes were kept in vigorous motion by an electric shaking apparatus, in order to prevent the leucocytes from sinking to the bottom of the tubes. After 45 minutes' incubation, the tubes were removed from the water bath and smears were made. Before making a smear, a uniform suspension was obtained by vigorously rolling the tube between the hands. After drying, the smears were fixed with methyl alcohol. After drying again, they were stained by submerging the slides for a few minutes in a weak solution of Bordet-Gengou's toluidine blue.[3]

Phagocytosis by the polymorphonuclear leucocytes alone was considered in this study. A characteristic picture of the phagocytosis of bacteria which have been sensitized with immune serum shows a large percentage of those leucocytes which participate in phagocytosis crowded full of bacteria. For this reason it was impossible to

[3] Bordet-Gengou's toluidine blue is made by dissolving 5 grams of toluidine blue in 100 cubic centimeters of alcohol, 500 cubic centimeters of water, and 500 cubic centimeters of 5 per cent phenol, and filtering after one or two hours. One part of stain was diluted with two parts of water for staining the smears.

count the number of cocci ingested as is commonly done in the opsonic test. Twenty-five polymorphonuclear leucocytes in each smear were examined, and the presence of bacteria was recorded in terms of percentage. It was observed that those leucocytes that were agglutinated generally contained more bacteria than the isolated leucocytes. Therefore, if there had been a clumping of the leucocytes, about one-half of the number counted was chosen from one or more groups and the remainder were counted from the isolated leucocytes. Record was kept of the percentage of phagocyting leucocytes, and also of the percentage of leucocytes containing more than 10 cocci. They were tabulated in terms of leucocytes "filled" with bacteria.

Description of the toxins.—The streptococcal skin toxin used in these experiments was prepared by Surg. M. V. Veldee, of the National Institute of Health, for his own experimental work. The strain used for the preparation of the toxin was the well-known "N. Y. 5," originally cultivated by Doctor Dochez from a case of scarlet fever. The organism was grown for 89 hours at 37° C., in Douglas tryptic digest medium, as described by Watson and Wallace. The filtered toxin was of an H ion concentration of pH 7.6. It had a toxin content of approximately 60,000 skin test doses per cubic centimeter.

Diphtherial and tetanus toxins were included in some of the tests to compare their action on leucocytes with that of the streptococcal toxin. The diphtherial toxin was a sample which had been sent to the National Institute of Health by a commercial firm. It contained approximately 500 M. L. D. per cubic centimeter for guinea pigs weighing 250 grams. The National Institute of Health standard tetanus toxin was used, diluted in buffered saline solution as indicated in the respective protocols.

The effect of streptococcal skin toxin on the phagocytic capacity of leucocytes.—The phagocytic experiments were planned so that the activity of the leucocytes exposed to streptococcal skin toxin could be compared with the activity of those exposed to several inert substances, in order to demonstrate the uniformity of the phagocytic activity of healthy leucocytes. Tetanus and diphtherial toxins served as inert substances. (Many years ago Bordet showed that diphtherial toxin does not affect leucocytes.) To demonstrate the sensitiveness of leucocytes to harmful substances, parallel tests were made with solutions of acetic acid and phenol. Acetic acid was chosen because it is one of the acids produced in the fermentation of carbohydrates by streptococci. (Langwill.)

The conditions for the parallel phagocytic tests on any given date were the same except for the one variable condition of the exposure of the leucocytes to the various test or control substances. Hence

the given figures in any one protocol are comparable, but they are not comparable with the figures given in other protocols, because conditions such as abnormal temperatures to which the leucocytes might be subjected during the course of preparation of the suspension, the phagocytic efficiency of the leucocytes of the different individual rabbits, and other conditions might vary from day to day. Thus the figures for the uninjured leucocytes are markedly lower in the protocols shown in Tables 2 and 4 than in those shown in Tables 1 and 3. The conclusions to be drawn from the several protocols, however, are in agreement.

It was a surprise to find that in 0.1 or 0.2 per cent solutions of phenol there was no inhibition of phagocytosis (see Table 1). It had previously been shown that phagocytosis was completely inhibited by 0.5 per cent solution. The limit of toleration for phenol was, therefore, determined. It was found that, although a 0.2 per cent solution does not affect the activity of the leucocytes, it is completely inhibited in a 0.4 per cent solution (see Table 2), and there is only slight activity in a 0.3 per cent solution (see Table 3).

The results of all the experiments agreed in showing that under the specified conditions streptococcal skin toxin has no effect on the phagocytic activity of leucocytes (see Tables 1, 2, and 3).

Recovery of leucocytes after injury due to acid.—The sensitiveness of leucocytes to acetic acid is demonstrated in Tables 2, 3, and 4. The results showing inhibition of phagocytosis by acetic acid agreed with those reported in the earlier publication.

TABLE 1.—*Protocol of experiment showing that, under the conditions of the phagocytic test, streptococcal skin toxin, tetanus toxin, and 0.1 per cent phenol do not injure the leucocytes. (Second washing of leucocytes was in buffered saline solution; final suspension was a solution of the test or control material)*

No. of the test	Control or test material	pH of the solutions of the control or test material	Dilution of immune serum used for sensitization of streptococci			Streptococci not sensitized but suspended in control solutions	
			1:20	1:40	1:80	Buffered saline solution	Normal serum diluted 1:20
1	Buffered saline solution	7.0	[1] 68	56	76	12	4
			[2] 48	28	36	0	0
2	Streptococcal toxin	7.6	76	64	60	16	4
			56	44	40	0	0
3	Tetanus toxin [3]	6.4	56	64	72	8	4
			40	56	64	0	0
4	0.1 per cent phenol	7.0	64	76	48	12	0
			56	40	20	0	

[1] The upper figure refers to the percentage of phagocyting leucocytes.
[2] The lower figure refers to the percentage of leucocytes containing 10 or more cocci.
[3] The tetanus toxin was diluted to contain approximately 4,800 M. L. D. per cubic centimeter for 350-gram guinea pigs.

TABLE 2.—*Protocol of experiment showing that, under the conditions of the phagocytic test, streptococcal skin toxin, tetanus toxin, and diphtherial toxin do not, while acetic acid and 0.4 per cent phenol do, injure the leucocytes. (Second washing and final suspension of the leucocytes were in solutions of the test or control material)*

No. of the test	Control or test material	pH of the solutions of the control or test material	Dilution of immune serum used for sensitization of streptococci			Streptococci not sensitized but suspended in control solutions	
			1.20	1:40	1:80	Buffered saline solution	Normal serum diluted 1:20
1	Buffered saline solution	7.0	[1] 44	48	40	16	8
			[2] 20	16	20	4	0
2	Streptococcal toxin	7.6	44	36	36	12	8
			16	16	16	4	0
3	Tetanus toxin [3]	6.4	32	52	32	16	8
			20	16	20	4	0
4	Diphtherial toxin	7.6	48	40	32	8	16
			16	12	12	4	0
5	Acetic acid	4.8	16	28	16	0	0
			0	4	12		
6	0 2 per cent phenol	7.0	64	56	40	16	8
			28	28	28	4	0
7	0.4 per cent phenol	7.0	12	8	4	0	0
			4	0	0		

[1] [2] See Table 1 for significance of the figures.
[3] The tetanus toxin was diluted to contain approximately 3,600 M. L. D. per cubic centimeter for 350-gram guinea pigs.

TABLE 3.—*Protocol of experiment showing that, under the conditions of the phagocytic test, streptococcal skin toxin and diphtherial toxin do not, while acetic acid and 0.3 per cent phenol do, injure the leucocytes. (Second washing and final suspension of the leucocytes were in solutions of the control or test material)*

No. of the test	Control or test material	pH of the solutions of the control or test material	Dilution of immune serum used for sensitization of streptococci			Streptococci not sensitized but suspended in control solutions	
			1:20	1:40	1:80	Buffered saline solution	Normal serum diluted 1:20
1	Buffered saline solution	7.0	[1] 60	68	40	16	0
			40	44	28	4	
2	Streptococcal toxin	7.6	64	48	48	12	8
			28	36	32	8	0
3	Diphtherial toxin	6.4	64	52	48	4	12
			32	24	12	0	0
4	Acetic acid	4.8	28	24	32	8	8
			8	12	8	4	0
5	0.3 per cent phenol	7.0	20	24	32	0	4
			0	4	4		0

[1] See Table 1 for the significance of the figures.

A few experiments were carried out to determine whether leucocytes readily recover from the injury caused by acetic acid. The protocol of a typical experiment is given in Table 4. The technique used for the phagocytic experiments previously described in this paper was modified for these tests. Leucocytes slightly injured so that phagocytic

activity was only partially destroyed and leucocytes which had been exposed to amounts of acid very slightly exceeding their limit of toleration were used. Under the conditions of these experiments leucocytes washed in acetic acid of an H ion concentration of pH 4.8 showed partial destruction of phagocytic activity, and those washed in acetic acid of an H ion concentration of pH 4.6 showed almost or quite complete destruction of phagocytic activity. These and slightly greater concentrations of acid, were used in the experiments.

The leucocyte suspension in sodium citrate solution as obtained from the pleural cavities of a rabbit was divided into eight portions and centrifugated, and the supernatant fluid was poured away. The tubes were then divided into two series, A and B, of four tubes each. The leucocytes in the tubes of the series designated A were tested for phagocytic activity immediately after washing in the various control and test solutions, and those in the corresponding tubes of the B series which had been exposed to the same solutions as those of the A series were suspended in several cubic centimeters of fresh serum from a normal rabbit and incubated in a water bath at 37° C. for an hour or two and then tested for phagocytic activity. The treatment of the leucocytes in the various tubes after the first centrifugation and disposal of the sodium citrate solution was as follows:

Series A. Tube 1 (control)—(*a*) The leucocytes were washed in 12 cubic centimeters of buffered saline solution and centrifugated. (*b*) They were resuspended in 1.5 cubic centimeters of the buffered saline solution and added to the sensitized bacteria to test for phagocytic capacity.

Tube 2.—The leucocytes were treated like those in Tube 1 except that the washing and final suspension was in acetic acid of pH 4.8.

Tube 3.—The leucocytes were treated like those in Tube 1 except that the washing and final suspension was in acetic acid of pH 4.6.

Tube 4.—The leucocytes were treated like those in Tube 1 except that the washing and final suspension was in acetic acid of pH 4.4.

Series B. The four tubes of Series B were treated like the corresponding tubes of Series A through (*a*) and (*b*). (*c*) The suspensions were centrifugated and the leucocytes were resuspended in a few cubic centimeters of fresh rabbit serum and incubated for an hour or two in a water bath at 37° C. (*d*) The suspensions were centrifugated again and the supernatant serum was poured away. (*e*) The leucocytes were resuspended in 1.5 cubic centimeters of buffered saline solution, and this suspension was added to sensitized bacteria to test the phagocytic capacity of the leucocytes. All the tests were carried out in triplicate, with the same strain of streptococcus sensitized with the same increasing dilutions, all low, of the same high titered homologous serum used in the experiments recorded in Tables 1, 2, and 3.

Table 4 shows that leucocytes whose phagocytic capacity had been slightly injured by washing in acetic acid of pH 4.8 were restored to their usual activity (as compared with leucocytes washed in buffered saline solution) by incubation in fresh serum. Leucocytes whose phagocytic activity had been almost completely inhibited by washing in acetic acid of pH 4.6 were also restored to their usual activity by incubation in fresh serum. On the other hand, the leucocytes which had been washed in acetic acid of pH 4.4 were so badly injured that incubation in fresh serum had no effect on them. The experiment was repeated several times with similar results.

Table 4.—*Protocol of experiment showing the effect of incubation in normal serum on leucocytes which have been injured by acetic acid*

[The triplicate sets of figures show leucocytic activity for bacteria sensitized with three different low dilutions of homologous immune serum]

No. of the tube containing the leucocyte suspension	Treatment of the leucocytes	Series A (Activity of leucocytes was tested immediately after washing in the control or test solutions)			Series B (Activity of leucocytes was tested after washing in control or test solutions and then incubating for an hour in fresh serum)		
1	(Control) washed in buffered saline solution pH 7.0.	[1] 32 [2] 12	40 20	36 20	40 20	32 16	28 16
2	Washed in acetic acid, pH 4.8	16 12	20 12	16 4	28 20	28 16	44 20
3	Washed in acetic acid pH 4.6	12 4	4 0	4 0	32 20	20 16	32 20
4	Washed in acetic acid pH 4.4	4 0	0	4 0	4 0	0	4 0

[1,2] See Table 1 for the significance of the figures

It would be impossible to duplicate in a test tube experiment the injury done to leucocytes by the acids produced by the bacteria in a focus of infection. The body fluids are sufficiently buffered so that the circulating blood never reaches an H ion concentration low enough to affect the leucocytes. But due to their strong affinity for acids it appears possible that the leucocytes accumulated at the site of infection may gradually take up the acids until their limit of toleration is reached and phagocytic capacity is finally crippled. There would be a continuous absorption of dilute acids, and at the same time there would be a more or less continuous restoration to a healthy condition, dependent on the flow of blood through the focus of infection. The results of the experiments suggest that leucocytes slightly injured by acid may be restored to their usual activity if there is a good circulation of blood in the focus of infection; whereas if the blood supply is deficient, the leucocytes may become injured beyond recovery.

THE DISINTEGRATION OF LEUCOCYTES BY STREPTOCOCCI [4]

An attempt was made to demonstrate the disintegration of washed leucocytes in the presence of washed streptococci by changes in the H ion concentration of the saline solution in which they were suspended. A slight increase of H ions was sometimes indicated but this method of detecting the disintegration of leucocytes was abandoned because there were too many complicating factors, chief among which was the increase of H ions, due to the autolysis of the leucocytes.

When washed leucocytes and washed streptococci were suspended together in physiological saline solution, the disintegration of the leucocytes could be observed in microscopic preparations. The technique described for the phagocytic test was used for obtaining and washing the leucocytes and for the preparation of slides for microscopic examination. It was necessary to wash the streptococci rapidly because their capacity for attacking the leucocytes was quickly injured by saline solution. The culture was centrifugated, the supernatant fluid was removed, and a few cubic centimeters of saline solution were allowed to flow gently over the sediment without disturbing it. The wash fluid was removed and the sediment was emulsified in a small quantity of saline solution, making a heavy suspension, which was immediately added to a suspension of washed leucocytes. Under these conditions there was practically no phagocytosis. Smears prepared after 2, 3, or 4 hours' incubation showed definite disintegration of leucocytes, as compared with control suspensions without streptococci, or with streptococci killed by heat. The disintegrated leucocytes appeared as faintly stained forms, without demonstrable nuclei. After longer incubation the leucocytes in the control tubes underwent similar changes, due to autolysis.

The lysis of leucocytes by living streptococci could be more readily demonstrated if broth instead of saline solution were used for washing the streptococci and leucocytes and for the final suspension in the experiment just outlined. Leucocytes suspended in broth do not autolyze for many hours. Hence there was a definite contrast between the disintegrated leucocytes in the suspensions with living streptococci and the healthy leucocytes in the control suspensions. The contrast was marked after three or four hours' incubation. After 21 hours' incubation no recognizable leucocytes could be found in smears of the growing streptococcus cultures, whereas those in smears from the control tubes were fairly well stained.

If leucocytes were suspended in a filtrate of broth culture of hemolytic streptococci they retained their staining properties as well as if suspended in broth. Hence it may be stated that no demonstrable toxic substance is excreted into broth by growing streptococci

[4] The scarlet fever strain known as Dick I was used in these tests.

when judged by the effect of the filtrate on the staining properties of the leucocytes.

THE BIOSCOPIC TEST

The bioscopic test of Neisser and Wechsberg is the most delicate test for determining whether leucocytes have been injured. In this test the vitality of the leucocytes is measured by their capacity for reducing methylene blue to the colorless reductant.

The test was carried out as follows: A suspension of washed leucocytes was obtained in the same manner as that employed for the phagocytic test. One-half of a cubic centimeter of heavy leucocyte suspension (the yield from one rabbit in 6 or 8 cubic centimeters of broth) were added to 2 cubic centimeters of the test or control solution in 1 by 7 millimeter reagent tubes, with 2 drops of 0.5 per cent aqueous solution of methylene blue. A uniform suspension was obtained by drawing the mixture into a pipette; then the contents of the tubes were covered with a layer of 0.5 cubic centimeter of liquid petrolatum. Control tubes were always set up without leucocytes to show that there was nothing in the test fluid which would bring about the reduction of methylene blue. The rack of tubes was placed in a 37° C. water bath, and readings were made at intervals up to two hours.

The demonstration of a toxic substance by the bioscopic test.—The bioscopic test was used to demonstrate substances injurious to leucocytes in scarlet fever skin toxin, in filtrates of young broth cultures of hemolytic streptococci, and in filtrates of cultures in broth with various additions. Kidney tissue, blood serum, washed leucocytes or washed erythrocytes from rabbits were added to broth at different times to determine their possible influence on the production of leucocidic substances. The tests were usually made with filtrates of 24-hour cultures, although it was found that the results were the same when tests were made with filtrates of older cultures. The strain known as Dick I was used in the preparation of filtrates for some of the tests and a strain, No. 663, freshly isolated from the throat in a case of scarlet fever was used for the preparation of filtrates for other tests. The two strains gave the same results.

TABLE 5.—*Protocol of bioscopic tests showing that a trace of toxic substance is excreted into broth by growing hemolytic streptococci*

Leucocytes were suspended in—	Incubated for—		
	30 minutes	1 hour	2 hours
Broth, pH 7.0	Complete reduction		
Scarlet-fever toxin	Partial reduction	Complete reduction	
Filtrate of broth culture	do	do	
Broth with acetic acid, pH 4.8	No reduction	No reduction	No reduction.

TABLE 6.—*Protocol of bioscopic tests showing that the addition of kidney tissue, blood serum, or washed leucocytes does not influence the production of toxic substance, whereas it is produced abundantly in broth containing washed erythrocytes*

Leucocytes were suspended in—	Incubated for—		
	30 minutes	1 hour	2 hours
Broth	Complete reduction.		
Filtrate of broth culture	Partial reduction	Complete reduction.	
Filtrate of culture in broth plus kidney tissue.	do	do	
Filtrate of culture in broth plus blood serum.	do	do	
Filtrate of culture in broth plus washed leucocytes.	do	do	
Filtrate of culture in broth plus washed erythrocytes.	No reduction	No reduction	No reduction.

The results of repeated tests are summarized in Table 5. Broth adjusted to a reaction of pH 4.8, by the addition of acetic acid, was included among the test substances to compare the effect of the toxic substance in question with that of a known toxic substance. The acetic acid completely inhibited reduction. The table shows that the leucocytes suspended in broth completely reduced the methylene blue in 30 minutes, whereas leucocytes suspended in scarlet fever skin toxin[5] or in filtrates of young broth cultures partially reduced the methylene blue in 30 minutes, with complete reduction within an hour. This delay of reduction always occurred in tests with leucocytes suspended in the toxin or filtrates of young broth cultures, as compared with leucocytes suspended in broth. The data thus obtained with the bioscopic test show that there is a trace of leucocidic substance produced in broth by growing hemolytic streptococci. It may be recalled that no trace of this leucocidic substance could be detected by the phagocytic test, nor in microscopic preparations of treated leucocytes.

An effort was made to find some substance available to streptococci when they grow as parasites which might promote an excretion into the medium of the leucocidic substance. The data are presented in Table 6, which shows that the addition to broth of kidney tissue, blood serum, or washed leucocytes did not influence the production of leucocidic substance in the culture medium. In repeated tests the delay of reduction was the same for leucocytes suspended in filtrates of cultures grown in these media as for leucocytes suspended in filtrates of broth culture. On the other hand, the addition of washed erythrocytes to the broth markedly promoted the production of a toxic substance. There was no reduction of methylene blue during the two hours of observation when leucocytes were suspended in filtrate of culture in broth to which washed red cells (10 per cent of red cell suspension in which the washed cells were supsended in broth to make the original volume of blood) had been added.

[5] This was the same sample of toxin which was used in the phagocytic tests. It had a titer of approximately 60,000 skin-test doses per cubic centimeter.

The enhanced production of leucocidic substance in broth plus washed red cells was confirmed in microscopic preparations of leucocytes suspended in the filtrate of such a culture, as compared with those suspended in broth or filtrate of broth culture. There was definitely a more rapid disintegration of leucocytes suspended in the filtrate of culture in broth plus washed red cells than in the control tubes. Thus it was demonstrated by the observation of disintegration of leucocytes in microscopic preparations as well as by the bioscopic test, that a leucocidic substance is produced by streptococci from red blood cells.

Does serum contain an agent for the neutralization of the leucocidic substance? Bioscopic tests were carried out to determine whether normal or immune serum contains an agent to neutralize the leucocidic substance. In these tests 0.5 cubic centimeter of serum was added to 1.5 cubic centimeters of the test or control fluid, and the mixture was incubated for an hour and a half; then a suspension of leucocytes and methylene blue were added as for the bioscopic tests previously described. These tests were carried out with the recently isolated scarlet fever strain of streptococcus used in previous experiments (No. 663), and with homologous immune serum of high agglutinating titer prepared with formalin killed antigen (2 serums) or with one dose of living antigen following a course of treatment with killed antigen (1 serum).

Normal serum is a better medium than broth to maintain the vitality of leucocytes, as can be demonstrated by the slightly more prompt reduction of methylene blue in broth plus 25 per cent of serum than in broth. Neither the normal nor the immune serum could be shown to enhance the reduction of methylene blue by leucocytes exposed to the leucocidic substance further than the slight advantage which was given by adding serum to the broth control. There was, therefore, no demonstrable specific neutralizing agent in either the normal or the immune serum.

THE NATURE OF THE LEUCOCIDIC SUBSTANCE

The thermolability of the substance toxic for leucocytes in the filtrate of culture in broth plus red cells was determined by means of the bioscopic test. The thermolability of the trace of leucocidic substance in scarlet fever toxin and in filtrates of young broth cultures was also determined by the same method and was found to be identical with that of the stronger leucocidic substance produced at the expense of erythrocytes. Presumably the same leucocidic substance is produced under the varying conditions. Temperatures of 37° C. for a day or under 56° C. for one hour do not affect it. There is slight destruction at 56° for one hour, and more with increasing temperatures up to 75° for one hour, at which temperature destruction

is almost complete. No trace of the leucocidic substance could be found after heating at 85° C. for one hour.

The thermolability of the leucocidic substance produced by hemolytic streptococci as reported here agrees with Van de Velde's leucocidin. He stated that the staphylococcal leucocidin is destroyed at about 58° C. There is, however, an objection to the application of the term "leucocidin" to the leucocidic substance produced by streptococci. Several authors (Eijkman; M'Leod and Govenlock; Rogers) have reported that streptococci as well as other bacteria produce a thermolabile substance which inhibits the growth of the homologous organism or other bacteria. This substance has been called "bactericidin." There is no evidence at hand to show whether or not the so-called bactericidin is identical with the leucocidic substance.

The injury done to leucocytes by the thermolabile toxic substance is quite different from that done by acid. Leucocytes injured beyond recovery by acid retain their morphology and staining properties, whereas leucocytes injured by the thermolabile toxic substance are disintegrated.

IS THE LEUCOCIDIC SUBSTANCE IDENTICAL WITH HEMOLYSIN?

Two lines of evidence are offered to show that the leucocidic substance produced by streptococci is not identical with hemolysin: (1) They differ in thermolability; (2) under certain conditions of growth the production of the leucocidic substance is enhanced, whereas under those same conditions hemolysin production is inhibited.

According to M'Leod and M'Nee hemolysin is destroyed by heating a few hours at 37° C. Their observations on the extreme theremolability of the streptococcal hemolysin were confirmed in this study. Hemolysin was destroyed by heating overnight at 37° C. or by heating one hour at 45° C.

Since the leucocidic substance is uninjured at 37° C. for a day, or at 45° for one hour, a filtrate of broth culture containing a vigorous hemolysin can be heated to destroy all the hemolysin without injuring the trace of leucocidic substance which it contains.

If the leucocidic substance were identical with hemolysin there should be an evident correlation between the vigor of action on the two types of blood cells manifest by filtrates of cultures grown under various conditions. A filtrate containing strong hemolysin should also contain strong leucocidic substance and vice versa. Hence if leucocidin and hemolysin were identical, there should be a much stronger content of hemolysin in the filtrate of culture in broth plus red cells than in the filtrate of broth culture, for it was shown (Table 6) that the filtrate of culture in broth plus red cells contains definitely

more leucocidic substance than the filtrate of broth culture. The facts, however, are contrary to that supposition. Experiments were carried out which showed that erythrocytes added to broth not only fail to enhance the production of hemolysin by *Streptococcus scarlatinae* (the "Dick 1" strain was used), but they even inhibit its production as compared with the production of hemolysin in broth without red cells.

TABLE 7.—*Protocol showing that erythrocytes in broth culture of* Streptococcus scarlatinae *interfere with the production of hemolysin*

Tube No.	Erythrocyte suspension	Test fluid	Hemolysis as determined by appearance of tubes before centrifugation	Erythrocytes remaining after incubation and centrifugation	Color readings after the erythrocytes were hemolysed in 10 cubic centimeters of water
1	0.4 cubic centimeter.	Broth (control)	No hemolysis	0.2 cubic centimeter sediment.	Deep red.
2	0.1 cubic centimeter.		do	0.05 cubic centimeter sediment.	Pale red.
3	0.4 cubic centimeter.	Filtrate of broth culture.	Complete hemolysis.	Slight colorless sediment.	Very faint tinge of color.
4	0.1 cubic centimeter.		do	No sediment	No color.
5	0.4 cubic centimeter.	Filtrate of culture in broth+erythrocytes.	Readings could not be made.	0.16 cubic centimeter sediment.	Color is almost as deep as in (1). The distinction is questionable.
6	0.1 cubic centimeter.			0.025 cubic centimeter sediment.	Color is not quite so deep as in (2).

The usual color test for hemolysin was not applicable to its determination in filtrates of cultures in broth containing erythrocytes, because the red color of the filtrate made comparative readings impossible in the final test. Hence the amount of hemolysis in the various experimental fluids was determined by measuring the amount of erythrocytes remaining. In the first experiment to compare the hemolysin content of a filtrate of streptococcus culture in broth with that in broth to which erythrocytes (rabbit) were added, the test for hemolysin was made with both rabbit and human erythrocytes, with identical results. There was very little, if any, hemolysis in the filtrate of culture in broth plus erythrocytes, whereas vigorous hemolysis occurred in the filtrate of broth culture. The experiment was repeated and the results are given in Table 7. Cultures were grown overnight in broth, and in broth containing the washed erythrocytes from 10 cubic centimeters of rabbit blood in 50 cubic centimeters of broth. After filtration, 10 cubic centimeters of the various test fluids were measured into graduated centrifuge tubes, and washed rabbit erythrocytes were added. Control tests were made in broth. To one series of tubes 0.4 cubic centimeter, and to another series 0.1 cubic centimeter of suspension of washed erythrocytes was added. The tubes were incubated for four hours in a 37° C. water bath, then were transferred to the refrigerator. On the following day, color readings

were made on tubes for which that was possible, then the tubes were centrifugated and the amount of sediment in the tubes was recorded. The supernatant fluid was removed and 10 cubic centimeters of water were added to each tube. After complete hemolysis had occurred, color readings were made again.

The data recorded in Table 7 show that there was only a minute quantity of hemolysin in the filtrate of culture containing erythrocytes, whereas there was abundant hemolysin in the filtrate of broth culture. A comparison of Tables 6 and 7 leads to the conclusion that the leucocidic substance is not identical with hemolysin, because the addition of erythrocytes to broth culture promotes the production of the leucocidic substance, whereas it inhibits the production of hemolysin.

IS THE LEUCOCIDIC SUBSTANCE IDENTICAL WITH SKIN TOXIN?

The thermolability of the leucocidic substance is about the same as that of the scarlet fever skin toxin. Hence, thermolability determinations gave no information as to the unity or duality of the toxic material. Evidence that the leucocidic substance is not the skin toxin was obtained, however, from the irregularity of the ratio of the two substances in various filtrates. It was noted in previous experiments that the delay in reduction of methylene blue by leucocytes was always the same, giving evidence of only a trace of leucocidic substance whether the test was made with skin toxin of a titer of 60,000 skin test doses or with filtrates of 24-hour cultures of any one of the three strains of streptococci used in the tests. Yet the "N. Y. 5" strain is known to produce two or three times as much skin toxin as the "Dick I" strain.

TABLE 8.—*Protocol of bioscopic tests showing that concentrated skin toxin contains less leucocidic substance than the unconcentrated toxin*

Leucocytes suspended in—	Reduction after incubation for —				
	20 minutes	30 minutes	35 minutes	40 minutes	45 minutes
Broth	Complete.				
Purified toxin, pH 8.2, 150,000 s. t. d.	None	Considerable	Almost complete.	Complete	
Purified toxin, pH 7.6, 150,000 s. t. d.	do	do	do	do	
Unpurified toxin, 60,000 s. t. d.	do	Slight	Considerable	Almost complete.	Complete.
Filtrate of culture No. 663	do	do	do	do	Do.
Filtrate of "Dick I" culture	do	do	do	do	Do.

A purified and concentrated preparation of skin toxin offered material for more decisive comparative tests. This toxin, prepared with the "N. Y. 5" strain, was purified and concentrated by precipitations with acetone, alcohol, acetic acid, and alcohol, respectively. The final product contained approximately 150,000 skin test doses

per cubic centimeter. Its H ion concentration was pH 8.2. A portion of the sample was adjusted to pH 7.6 by the addition of a trace of dilute acetic acid, and tests for leucocidic substance were made with both portions. Parallel tests were made with filtrates of 24-hour broth cultures and with the unpurified unconcentrated skin toxin used in previous experiments. A protocol of one of the experiments is given in Table 8. After the beginning of reduction of the methylene blue, readings were made every five minutes in order to detect even slight differences in the amount of leucocidic substance present in the fluids under observation. The two samples of purified toxin of slightly different H ion concentration behaved exactly alike, and the unpurified toxin behaved exactly like the two filtrates of young streptococcus cultures. Reduction was more prompt in the two samples of purified toxin than in the sample of unpurified toxin, although the purified toxin contained two and one-half times as many skin-test doses of toxin per cubic centimeter as the unpurified sample. The experiment was repeated with similar results. The results of these experiments indicate that the leucocidic substance is not identical with skin toxin.

SUMMARY

The results of the experiments may be summed up as follows:

1. Leucocytes are injured by acid. If the injury is not too great, they may be restored to a healthy condition by bathing in blood serum.

2. In filtrates of broth cultures of *Streptococcus scarlatinae* there is a trace of a substance toxic for leucocytes which can be detected by the bioscopic test, but not by the phagocytic test nor by the deterioration of cells as shown in stained microscopic preparations.

3. The addition of kidney tissue, blood serum, or washed leucocytes to broth cultures does not increase the production of the leucocidic substance. On the other hand, the addition of washed erythrocytes to broth cultures definitely promotes its increase.

4. The thermolability of the trace of leucocidic substance in filtrate of broth culture is the same as that of the more abundant leucocidic substance in filtrate of culture in broth plus erythrocytes. Presumably the two substances are identical.

5. A specific neutralizing agent for the leucocidic substance could not be demonstrated in normal or immune serum.

6. Two lines of evidence are offered which show that the leucocidic substance is not identical with hemolysin.

(*a*) They differ in thermolability.

(*b*) There is no correlation of toxicity for the two types of blood cells manifest by filtrates of cultures grown under varying conditions.

7. The decrease of leucocidic substance in purified and concentrated skin toxin indicates that leucocidic substance and skin toxin are not identical.

REFERENCES

Bordet, Jules (1909): Studies in Immunity, p. 37. New York.

Channon, Hilda A., and M'Leod, J. W. (1929): On the Importance of Thermolabile Streptococcal Toxin, with Special Reference to Its Cytolytic Effect on Leucocytes. J. Path. and Bact., Edinburgh, **32**:283–291.

Colebrook, L. (1925): Discussion on the Treatment of Septicaemia. Proc. Roy. Soc. Med. (London), **18**:64–70.

Cross, Howard B. (1921): An Experimental Study of Phagocytosis in Relation to Terminal Infections. Johns Hopkins Hosp. Bull. (Baltimore), **32**: 350–359.

Dold, H. (1930): Über in vitro nachweisbare Zell- und Organgifte aus Streptokokken (Leukozidin, allgemeine Cytozidine, Organozidine). Arch. f. Hyg. (Munich & Berlin), **103**: 10–19.

Downie, A. W. (1930): Experimental Streptococcal Infection and Immunity. J. Path. and Bact. (Edinburgh), **33**: 563–606.

Eijkman, C. (1904): Ueber thermolabile Stoffwechselprodukte als Ursache der natürlichen Wachstumshemmung der Mikroorganismen. Central. f. Bakt. (Jena), I Abt. **37**: 436–449.

Evans, Alice C. (1922): The Toxicity of Acids for Leucocytes, as Indicated by the Tropin Reaction. J. Immunol. (Baltimore), **7**: 271–304.

Hare, Ronald (1928): On the Phagocytosis of Haemolytic Streptococci of High and Low Virulence by the Blood of Patients Infected with That Organism. Brit. J. Exper. Path. (London), **9**: 337–352.

Langwill, Bertha (1924): The Character of Acids Produced by Hemolytic and Nonhemolytic Streptococci from Pathogenic Sources and from Milk. J. Bact. (Baltimore), **9**: 79–94.

Levaditi, C. (1918): Action leucotoxique du streptocoque des plaies de guerre. Considérations sur le mécanisme de la phagocytose. C. R. Soc. de Biol. (Paris), **81**: 1064–1067.

M'Leod, James Walter (1915): Criteria of Virulence Amongst Streptococci, with Some Remarks on Streptococcal Leucocidin. J. Path. and Bact. (Edinburgh), **19**: 392–416.

M'Leod, J. W., and Govenlock, P. (1921): The Production of Bactericidins by Micro-Organisms. Lancet (London), **200**: 900–903.

M'Leod, J. W., and M'Nee, J. W. (1913): On the Anaemia Produced by the Injection of the Hemolysin Obtained from Streptococci, and on the Question of Natural and Acquired Immunity to streptolysin. J. Path. and Bact. (Edinburgh), **17**: 524–537.

Nakayama, Yasushi (1920): On the Toxin for Leucocytes Produced by Streptococci (Streptoleukocidin). J. Inf. Dis. (Chicago), **27**: 86–100.

Neisser, Max, and Wechsberg, Friedrich (1901): Ueber das Staphylotoxin. Zeitsch. f. Hyg. (Leipsic), **36**: 299–349.

Rogers, L. A. (1928): The Inhibiting Effect of Streptococcus lactis on Lactobacillus Bulgaricus. J. Bact. (Baltimore), **16**: 321–325.

Van de Velde, Honoré (1894): Étude sur le mécanisme de la virulence du Staphylocoque pyogène. La Cellule (Louvain), **10**: 401–460.

Watson, A. F., and Wallace, U. (1923): Diphtheria Toxin Production on Douglas Medium. J. Path. and Bact. (Edinburgh), **26**: 447–458.

Wright, Sir Almroth E., Colebrook, L., and Storer, E. J. (1923): New Principles in Therapeutic Inoculation. Lancet (London), **204**: 365–373, 417–420, 473–478.

RAT-FLEA SURVEY OF THE PORT OF ST. THOMAS, VIRGIN ISLANDS

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Available sanitary records of the Virgin Islands do not show that epidemics of plague have ever occurred in any of this group of the West Indies. In view of the fact that epidemics of plague have occurred in neighboring islands, a rat-flea survey of the principal port of the Virgin Islands, St. Thomas, was undertaken to determine the infectibility of this port with plague, as indicated by the *cheopis* index.

During the 1921 epidemic of plague in Porto Rico a strict quarantine was maintained in the Virgin Islands against all Porto Rican ports. The nearest Porto Rican port is only 40 miles from St. Thomas. Fortunately, shipping at that time between these islands consisted mainly of sailing vessels which usually did not dock at St. Thomas, but lay at anchor in the harbor. Nevertheless, quarantine regulations to prevent the introduction of plague were strictly and successfully enforced.

METHOD OF SURVEY

The procedure of the survey was based on similar methods used in New York (1), San Juan (2), and Norfolk (3). Rats were captured alive in cage traps and brought to the quarantine office with the cage uncovered, being handled gently to guard against dislodging any fleas from the rats.

The rats were then killed with chloroform and the fleas collected in accordance with the ingenious method devised by Hasseltine (3) in the Norfolk survey of 1927–28. A small box with a hinged glass top was used for chloroforming the rats. In one end of the box a round hole was cut, which could be closed by a sliding partition. The box was lined with white paper. The cage trap containing the live rat was placed so that the hole for the rat's egress from the trap coincided with the hole in the end of the box. The rat, attempting to escape from the trap, usually went into the box of his own volition. The partition was then slid over the hole, the hinged glass top slightly raised, and gauze saturated with chloroform introduced. The rat when dead, as observed through the window, was removed and combed for fleas. The box was also shaken out to obtain any fleas that might have become dislodged from the rat. No rats escaped.

The fleas were preserved in 95 per cent alcohol and sent to the New York quarantine station for identification of species.

The survey began July 1, 1929, and ended June 30, 1930, being carried on entirely by the regular personnel of the U. S. quarantine station at St. Thomas. During the first four months of the survey the

daily average number of traps was 28; during the last eight months the daily average number was 51.

The town was divided into four zones for purposes of trapping. Zone 1 consisted entirely of the docks where the large vessels are berthed. The dock area is about three-quarters of a mile from the town proper, lying on the opposite side of the harbor, and connected overland by a road skirting the harbor and traversing marshy open land. Zone 2 consisted of all the water front of the town proper. Here the water is shallow, and only sloops and similar small vessels can tie up to the short docks of wood or concrete. The business district skirts this water front. Zone 3 also lies on the water front, but at the extreme western end of the harbor, and comprises a small fishing village, lying about one-half mile from the town itself. Zone 4 consists of the residential district and is made up of three hills sloping upwards rather sharply from the low lying water front and business district.

The docks of zone 1, where the large ships are tied up, are of concrete. The warehouses are constructed of concrete and metal, with a concrete floor and foundation. They afford practically no rat harborage. The buildings of zone 2, are of all types of construction and afford ample rat harborage, as do those of zone 3. The buildings of the residential district are made up of some dwellings built largely of stone, concrete, and masonry, interspersed with others which range from 2-story frame dwellings to mere shacks.

In the vicinity of St. Thomas the soil is hard and rocky, with scant vegetation.

DISTRIBUTION OF RATS

The total number of trap-days was 15,755; the daily average number of traps was 43. During the 365 days of trapping, 312 rats were caught, and a total of 2,113 fleas retrieved. Of the 312 rats, 309 were identified as *Rattus alexandrinus*, and 3 as *Rattus rattus*. None of the species *Rattus norvegicus* was found.

The greatest number of rats were taken in zones 2 and 4, where harborage was found to be most ample. Only three rats were captured in zone 1, which comprised the area of concrete docks and rat-proof warehouses.

Entire absence of the species *Rattus norvegicus* seemed unusual; but this is probably due to two factors. One of these is the absence of suitable harborage for this species. The soil is extremely hard and rocky, precluding much possibility of burrowing refuges. The sewers, most of which are open, are of concrete and masonry, running for comparatively short distances downhill to the sea. The second, and probably the most important factor, is the presence of the mongoose, which overruns the island and is the rat's natural enemy. The

presence of the mongoose and the lack of suitable harborage have probably caused the elimination of all of the rat species not adapted to life in trees or houses.

TABLE 1.—*Distribution of rats and fleas by months*

	Total rats	Rattus alexandrinus		Rattus rattus		Rats per hundred traps days per month	Fleas					Cheopis index
							X. cheopis		Ct. canis or felis		Total	
		Male	Female	Male	Female		Male	Female	Male	Female		
1929												
July	18	14	3	1	------	2.0+	95	66	------	------	161	8.00
August	16	6	10	------	------	1.9−	95	68	------	------	163	10.10
September	17	10	7	------	------	2.0+	93	61	------	------	154	9.05
October	18	13	5	------	------	2.0+	63	50	------	------	113	6.27
November	27	18	9	------	------	1.7+	46	33	2	1	82	2.92
December	19	8	11	------	------	1.2+	45	51	------	------	96	5.00
1930												
January	23	10	13	------	------	1.4+	49	34	------	------	83	3.60
February	31	11	20	------	------	2.1+	92	124	1	------	217	7.0
March	32	19	12	1	------	2.0+	105	160	------	------	265	8.28
April	36	16	20	------	------	2.3+	95	133	------	1	229	6.33
May	39	20	18	------	1	2.4+	119	153	------	------	272	6.98
June	36	18	18	------	------	2.3+	130	148	------	------	278	7.70
Total	312	163	146	2	1	[a] 1.9	1,027	1,081	3	2	2,113	[a] 6.75

[a] Average.

TABLE 2.—*Distribution of rats and fleas by zones*

Zone	Total number of rats caught	Fleas recovered					Total number of fleas per rat	Total number of X. cheopis per rat
		X. cheopis		Ct. canis or felis		Total		
		Male	Female	Male	Female			
1	3	8	9	----------	----------	17	5.7	5.7
2	134	462	485	1	1	949	7.09	7.08
3	42	96	118	----------	----------	214	5.00	5.00
4	133	495	435	2	1	933	7.00	7.00
Total	312	1,061	1,047	3	2	2,113	6.77	6.75

Table 1 shows the distribution of rats and fleas by months, Table 2 presents the distribution by zones, and Chart 1 shows the relations of temperature, rainfall, "rat take" by months, and *cheopis* index. As no data of relative humidity were obtainable, the amount of rainfall by months was substituted for this factor.

DISTRIBUTION OF FLEAS

A total number of 2,113 fleas was recovered from 312 rats. Of this number 2,108, or 99.7 per cent, were identified as *Xenopsylla cheopis*, and 5, or 0.3 per cent as *Ctenocephalus felis* or *canis*. Relative proportions of male and female are shown in Table 1. The average number of fleas per rat was 6.7, and as *Xenopsylla cheopis* constituted

99.7 per cent of the fleas, the *cheopis* index (4) for all practical purposes may be taken as the same figure, 6.7.

The St. Thomas *cheopis* index of 6.7 is only slightly below the *cheopis* index of 7.05 of San Juan (2), where plague has occurred within the past 9 years. The index is higher than that of New Orleans and other ports of the continental United States.

Factors that influence the prevention of the introduction of plague into this port are the practically rat-proof docks and warehouses, the distance of these docks from the main body of the town, and the character of the shipping entering the port. St. Thomas is largely a bunkering port, the majority of vessels being in port for a few hours only to obtain bunker coal or fuel oil. The greater number of vessels arriving from ports plague-infected, or recently plague-infected, are

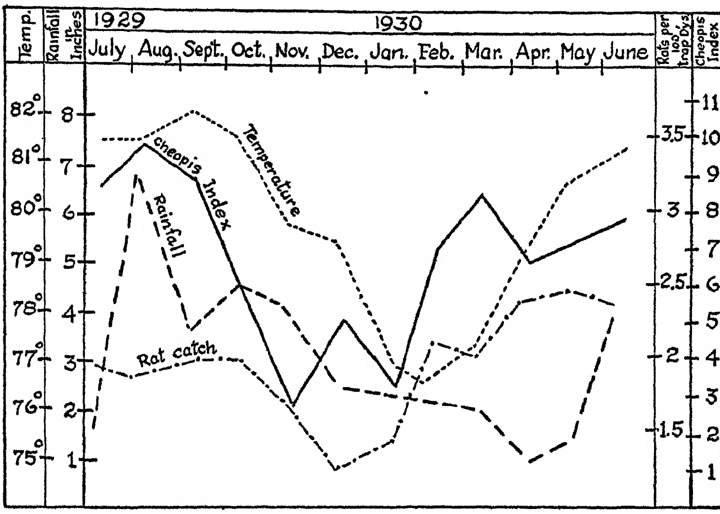

CHART 1.—Graphs showing temperature, rainfall, number of rats caught per 100 trap days, and cheopis index

laden with such cargoes as nitrates, ores, etc., which do not attract rats. Most of these vessels enter under provisional pratique and are required to breast off 4 feet from the dock, apply standard rat guards on all lines, and raise gangways at night. As soon as they have finished coaling, they depart. In the case of vessels from ports badly infected with plague, in addition to these precautions such vessels are allowed alongside the dock only during daylight hours and are kept under strict surveillance.

SUMMARY

1. A rat-flea survey of the port of St. Thomas, Virgin Islands, from July 1, 1929, to June 30, 1930, resulted in the capture of 312 rats, from which 2,113 fleas were taken.

2. Of the 2,113 fleas, 2,108, or 99.7 per cent, were identified as *Xenopsylla cheopis*, and 5, or 0.3 per cent, as *Ctenocephalus canis* or *felis*.

3. On the basis of the figures obtained, the average rat-flea index for the period was 6.7, which was approximately the *Xenopsylla cheopis* index.

4. The *cheopis* index was high throughout the year, but relatively highest during the summer months (March to September, inclusive) and varied in direct relation to temperature and rainfall.

5. *Rattus alexandrinus* was found to be the predominating rat. None of the species, *Rattus norvegicus*, was found.

6. It would seem that, should plague be introduced, it would spread rapidly, as all conditions appear favorable for its propagation.

7. All possible precautions are being taken to prevent the introduction of plague by shipping, and the local sanitary authorities, advised of the result of the survey, are making efforts toward a rat-eradication campaign.

ACKNOWLEDGMENTS

It is desired to express appreciation and acknowledge indebtedness to Medical Director Carroll Fox, of the United States Public Health Service, in charge of the New York quarantine station, and to Surg. C. L. Williams, of the United States Public Health Service, in charge of the laboratory at that station, for their kindness and cooperation in making the identification of species of fleas. To them belongs the credit for the truly scientific part of the survey.

REFERENCES

(1) Fox, Carroll, and Sullivan, E. C.: A comparative study of rat-flea data for several seaports of the United States. Pub. Health Rep., vol. 40, September 11, 1925, pp. 1909-1934.

(2) Cox, O. H., Carrion, Arturo L., and Fox., Carroll: Rat-flea survey of the port of San Juan, Porto Rico. A preliminary report. Pub. Health Rep., vol. 43, March 16, 1928, pp. 611–616.

(3) Hasseltine, E. H.: Rat-flea survey of the port of Norfolk, Va. Pub. Health Rep., vol. 44, March 15, 1929, pp. 579-589.

(4) Grubbs, S. B.: Bubonic plague and maritime quarantine. Pub. Health Rep., vol. 42, August 12, 1927, pp. 2045-2056.

COURT DECISION RELATING TO PUBLIC HEALTH

Law prohibiting the adulteration of coffee upheld.—(United States Circuit Court of Appeals, First Circuit; Gonzalez *v.* People of Porto Rico, 51 F. (2d) 61; decided June 29, 1931.) Section 1 of act 24 of the 1928 acts of Porto Rico provided as follows:

SECTION 1. It shall be illegal to adulterate or to mix coffee, in the grain, ground or pulverized, with any other grain or substance with the intention of selling it, or to offer or have it for sale, and it shall be equally illegal for said

coffee, so adulterated or mixed, to be sold, offered or had for sale, or that it be transported or stored for the purpose of using it for human consumption, or to use it for industrial purposes, when intended for the preparation of food for human consumption.

In a prosecution for a violation of this act, it was charged that the appellant (defendant in the trial court) "unlawfully, willfully, and maliciously had and offered for sale * * * coffee roasted and ground, adulterated with another substance known as sugar." A conviction was had and this conviction was sustained by the Supreme Court of Porto Rico. On appeal to the circuit court of appeals, the contentions of appellant were (1) that the facts alleged in the information, admitted and found, did not constitute a public offense because section 1 was unconstitutional, and (2) that section 1 was invalid because in conflict with the Federal food and drugs act, which act allowed harmless adulterations provided the container or package bore a label stating the substance with which the article was adulterated and the percentage of the adulteration. The adulteration in the instant case was not injurious to health and the package bore a label stating that the coffee was mixed with 4½ per cent of sugar.

The statement by the Supreme Court of Porto Rico as to the object of the law was quoted by the circuit court of appeals as follows:

The purpose of the law was to protect the public against fraud and deceit by discouraging the admixture of cheaper or inferior grain or other substance, whether wholesome or unwholesome, which would increase the weight and impair the quality of coffee as such.

The appellate court then proceeded to hold that the legislature had acted within its constitutional powers in enacting the statute.

With respect to the appellant's second contention, the circuit court of appeals took the view that the court below had not erred "in holding that the national food and drugs act did 'not forbid the enactment of any local law prohibiting the manufacture of, or traffic in, food or other things'; and that there was 'no conflict between that statute and the law now under consideration.'"

DEATHS DURING WEEK ENDED OCTOBER 3, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended October 3, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Oct. 3, 1931	Corresponding week, 1930
Policies in force	74,736,758	75,450,406
Number of death claims	13,577	12,460
Death claims per 1,000 policies in force, annual rate	9.5	8.6
Death claims per 1,000 policies, first 40 weeks of year, annual rate	9.8	9.7

Deaths[1] from all causes in certain large cities of the United States during the week ended October 3, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended Oct. 3, 1931				Corresponding week, 1930		Death rate[2] for the first 40 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Total (82 cities)	6,593	9.6	584	[4] 46	10.0	660	12.0	12.0
Akron	37	7.5	6	59	9.4	5	7.8	7.9
Albany[5]	27	10.9	1	20	9.8	3	13.8	14.9
Atlanta	72	13.5	9	92	11.7	9	15.2	15.7
White	39		5	79		4		
Colored	33	([6])	4	115	([6])	5	([6])	([6])
Baltimore[5]	168	10.8	15	51	10.8	21	14.5	14.0
White	118		8	35		14		
Colored	50	([6])	7	109	([6])	7	([6])	([6])
Birmingham	60	11.6	2	20	12.2	3	13.6	13.8
White	35		1	17		0		
Colored	25	([6])	1	21	([6])	3	([6])	([6])
Boston	207	13.7	20	57	11.6	24	14.3	14.1
Bridgeport	19	6.7	2	33	7.8	0	11.1	11.1
Buffalo	125	11.2	13	53	10.8	11	13.2	13.0
Cambridge	22	10.1	0	0	14.7	6	12.2	11.8
Camden	22	9.6	0	0	10.5	1	14.4	13.6
Canton	20	9.8	1	23	6.4	1	10.2	10.0
Chicago[5]	569	8.6	43	38	8.9	50	10.8	10.5
Cincinnati	118	13.5	16	96	13.4	21	16.1	15.6
Cleveland	176	10.1	17	49	9.4	19	11.3	11.2
Columbus	63	11.1	4	39	11.1	5	13.7	15.6
Dallas	36	6.9	2		7.3	5	11.2	11.5
White	21		1			4		
Colored	15	([6])	1		([6])	1	([6])	([6])
Dayton	41	10.3	4	56	9.5	4	11.9	10.6
Denver	63	11.3	11	106	13.4	7	14.0	14.8
Des Moines	29	10.5	3	53	11.3	3	11.1	11.8
Detroit	217	6.8	27	43	8.7	35	8.3	9.4
Duluth	18	9.2	1	25	10.8	2	11.4	11.3
El Paso	14	7.0	6		14.7	11	15.8	17.5
Erie	15	6.6	0	0	11.7	3	10.6	11.3
Fall River[7 5]	24	10.9	1	23	7.7	0	11.2	12.0
Flint	12	3.8	4	51	8.3	6	7.0	9.3
Fort Worth	24	7.5	1		9.8	4	10.9	11.1
White	16		1			4		
Colored	8	([6])	0		([6])	0	([6])	([6])
Grand Rapids	24	7.3	4	59	6.2	1	9.1	10.3
Houston	59	9.9	5		11.8	6	11.3	12.2
White	41		3			5		
Colored	18	([6])	2		([6])	1	([6])	([6])
Indianapolis	91	12.8	4	33	14.0	3	14.0	14.8
White	70		3	28		3		
Colored	21	([6])	1	67	([6])	0	([6])	([6])
Jersey City	50	8.2	6	53	8.7	7	11.6	11.3
Kansas City, Kans	19	8.1	3	62	12.4	2	12.7	11.7
White	19		3	74		1		
Colored	0	([6])	0	0	([6])	1	([6])	([6])
Kansas City, Mo	81	10.3	5	38	11.0	3	13.2	13.3
Knoxville	16	7.6	2	43	8.8	2	12.6	13.7
White	11		2	48		2		
Colored	5	([6])	0	0	([6])	0	([6])	([6])
Long Beach	27	9.2	0	0	10.5	3	9.8	9.9
Los Angeles	216	8.5	9	26	8.1	18	10.7	11.0
Louisville	59	10.0	5	43	11.2	6	14.4	13.6
White	44		4	39		6		
Colored	15	([6])	1	66	([6])	0	([6])	([6])
Lowell	26	13.5	4	102	11.9	5	12.7	13.4
Lynn	16	8.1	1	26	9.7	2	9.6	10.5
Memphis	78	15.7	13	138	10.3	8	16.7	17.2
White	41		9	150		3		
Colored	37	([6])	4	116	([6])	5	([6])	([6])
Miami	22	10.2	1	25	8.9	1	11.9	11.1
White	16		0	0		0		
Colored	6	([6])	1	88	([6])	1	([6])	([6])

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended October 3, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued.

City	Week ended Oct. 3, 1931				Corresponding week, 1930		Death rate [2] for the first 40 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Milwaukee	97	8.6	5	22	8.8	11	9.4	9.7
Minneapolis	78	8.6	6	39	9.5	3	11.3	10.7
Nashville	41	13.7	8	119	15.9	10	17.0	16.6
White	20		4	80		4		
Colored	21	(6)	4	236	(6)	6	(6)	(6)
New Bedford [7]	28	13.0	2	53	11.1	0	12.2	11.0
New Haven	29	9.3	0	0	11.9	7	12.4	12.8
New Orleans	102	11.4	11	60	15.2	15	17.0	17.4
White	65		6	50		8		
Colored	37	(6)	5	81	(6)	7	(6)	(6)
New York	1,154	8.5	109	46	8.4	99	11.3	10.9
Bronx Borough	153	6.0	11	25	6.0	10	8.3	8.0
Brooklyn Borough	409	8.1	50	53	7.7	41	10.4	9.9
Manhattan Borough	422	12.1	39	66	11.8	32	17.0	16.1
Queens Borough	131	5.9	7	19	6.3	13	7.3	7.1
Richmond Borough	39	12.4	2	36	13.7	3	13.9	14.4
Newark, N. J	70	8.2	5	26	10.8	10	11.7	12.1
Oakland	64	11.4	4	51	12.2	4	10.6	11.0
Oklahoma City	23	6.1	4	55	7.8	2	10.9	10.8
Omaha	52	12.5	4	45	16.0	3	13.9	13.7
Paterson	34	12.8	8	138	13.5	6	13.4	12.4
Peoria	25	12.0	4	105	7.4	1	12.6	12.4
Philadelphia	363	9.6	26	38	10.0	36	13.2	12.7
Pittsburgh	125	9.6	17	59	10.6	18	14.6	13.8
Portland, Oreg	72	12.2	1	12	10.0	2	11.6	12.1
Providence	56	11.5	8	74	13.4	7	12.8	13.1
Richmond	41	11.6	3	44	11.1	2	15.7	14.9
White	25		1	22		1		
Colored	16	(6)	2	87	(6)	1	(6)	(6)
Rochester	66	10.4	9	82	9.2	2	12.0	11.5
St. Louis	157	9.9	14	47	9.9	12	13.3	14.2
St. Paul	41	7.7	5	52	9.2	2	10.8	10.1
Salt Lake City [5]	26	9.5	3	45	7.8	0	12.2	12.2
San Antonio	68	14.8	9		8.7	4	14.6	16.7
San Diego	48	16.0	2	41	12.2	3	13.7	14.4
San Francisco	164	13.2	3	20	12.1	6	13.1	13.1
Schenectady	15	8.1	0	0	12.5	3	10.5	11.4
Seattle	79	11.1	4	38	10.1	2	11.4	10.9
Somerville	14	6.9	1	37	9.5	1	9.0	9.8
South Bend	18	8.7	2	50	9.4	5	8.1	8.9
Spokane	20	9.0	1	26	13.1	2	12.4	12.4
Springfield, Mass	35	12.0	1	15	11.8	2	11.8	12.2
Syracuse	29	7.1	0	0	10.2	3	11.6	11.6
Tacoma	20	9.7	2	51	10.2	1	12.0	12.5
Toledo	79	13.9	5	46	12.5	12	12.0	12.7
Trenton	19	8.0	1	17	14.8	4	16.5	16.6
Utica	26	13.2	1	26	11.3	1	14.1	14.8
Washington, D. C	128	13.5	13	72	12.1	17	15.9	15.1
White	83		6	40		8		
Colored	45	(6)	7	120	(6)	9	(6)	(6)
Waterbury	8	4.1	0	0	7.3	1	9.7	9.8
Wilmington, Del. [7]	22	10.8	3	63	11.7	6	14.0	14.5
Worcester	38	10.0	5	69	11.5	3	12.1	12.8
Yonkers	13	4.9	0	0	8.9	1	8.6	8.1
Youngstown	24	7.2	4	56	10.4	5	10.2	10.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 77 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kan., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30; New Orleans, 26; Richmond, 32; and Washington, D. C., 25.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended October 10, 1931, and October 11, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 10, 1931, and October 11, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930
New England States:								
Maine	4	2	1	7	46		0	0
New Hampshire	1	10			1		0	0
Vermont		4			1		0	0
Massachusetts	56	47	1	6	22	28	1	1
Rhode Island	2	25			53	1	0	0
Connecticut	6	5	1	2	11	9	1	0
Middle Atlantic States:								
New York	80	75	[1] 2	[1] 7	58	52	5	10
New Jersey	15	63	4	5	2	31	4	2
Pennsylvania	81	90			118	52	7	2
East North Central States:								
Ohio	111	41	7	8	2	10	1	3
Indiana	36	11		4	7	2	1	3
Illinois	79	131	62	24	8	17	4	8
Michigan	29	47	2	1	25	36	4	10
Wisconsin	16	21	14	25	12	67	2	3
West North Central States:								
Minnesota	15	13			2	7	3	1
Iowa	6	9			1	4	1	1
Missouri	73	43	1	2	1	32	2	3
North Dakota	5	2			18	8	1	0
South Dakota	17	13			9	1	1	1
Nebraska	17	9				7	0	0
Kansas	19	18	3	1	10	1	1	1

[1] New York City only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 10, 1931, and October 11, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930
South Atlantic States:								
Delaware	4					1	0	0
Maryland [2] [3]	68	32	6	5	3	5	0	1
District of Columbia	10	22			1	2	2	0
Virginia								
West Virginia	55	28	19	8	9	15	3	0
North Carolina	199	173	2	10	14	3	2	0
South Carolina [3]	32	58	154	251	4		1	3
Georgia [3]	32	21	11	24		10	0	0
Florida [3]	18	13	1		16	1	0	0
East South Central States:								
Kentucky	175	9				37	2	0
Tennessee	171	60	5	16	1	6	2	8
Alabama	101	62		20	11	28	4	1
Mississippi	138	38					0	0
West South Central States:								
Arkansas	44	12		15	3	1	0	0
Louisiana	22	14	3	1	2	1	0	0
Oklahoma [4]	99	66	2	1		5	0	3
Texas	35	25	12	12	2	2	0	0
Mountain States:								
Montana	1	6			10		0	1
Idaho	3				2	6	0	0
Wyoming		1			1		0	0
Colorado	11	7			3	27	1	1
New Mexico	9	11				5	0	1
Arizona	6	9	7	1	1	9	2	4
Utah [2]	1	2		4	1	1	0	0
Pacific States:								
Washington	6	22			7	2	0	3
Oregon	1	2	22	6	6	21	1	1
California	61	55	73	26	71	62	3	2

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930
New England States:								
Maine	8	16	9	6	0	0	3	5
New Hampshire	8	2	5	2	0	0	1	0
Vermont	6	0	4	2	1	0	2	0
Massachusetts	72	53	151	87	0	0	12	9
Rhode Island	5	2	7	5	0	0	0	1
Connecticut	45	10	9	16	0	0	5	11
Middle Atlantic States:								
New York	239	51	184	111	0	0	35	35
New Jersey	50	9	54	49	0	0	12	11
Pennsylvania	40	9	187	141	0	0	69	139
East North Central States:								
Ohio	8	56	178	174	0	3	57	49
Indiana	5	14	48	81	3	8	12	15
Illinois	61	27	178	193	16	9	51	28
Michigan	74	15	102	119	2	2	20	83
Wisconsin	49	16	22	62	1	0	3	3
West North Central States:								
Minnesota	58	13	30	33	0	3	3	1
Iowa	13	21	31	39	5	15	5	2
Missouri	7	27	107	42	8	10	15	24
North Dakota	1	0	19	12	5	3	5	4
South Dakota	0	24	7	8	2	5	8	1
Nebraska	1	15	18	14	1	9	1	6
Kansas	1	57	46	41	2	3	13	13

[2] Week ended Friday.
[3] Typhus fever, 1931, 11 cases: 1 case in Maryland, 2 cases in South Carolina, 6 cases in Georgia, and 2 cases in Florida.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 10, 1931, and October 11, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930	Week ended Oct. 10, 1931	Week ended Oct. 11, 1930
South Atlantic States.								
Delaware	1	0	5	4	0	0	2	10
Maryland [2] [3]	5	3	61	33	0	0	33	54
District of Columbia	3	1	15	10	0	0	9	5
Virginia	1							
West Virginia	3	3	43	48	0	1	79	58
North Carolina	7	1	111	109	3	0	23	23
South Carolina [3]	0	1	9	22	0	0	22	46
Georgia [3]	0	3	34	32	2	0	28	37
Florida [3]	0	0	0	6	0	1	3	3
East South Central States:								
Kentucky	1	3	68	27	0	5	68	30
Tennessee	3	5	63	54	1	2	30	41
Alabama	0	3	66	66	0	1	33	15
Mississippi	0	2	40	26	1	1	27	19
West South Central States:								
Arkansas	0	4	23	7	1	5	19	45
Louisiana	1	3	17	9	2	0	40	21
Oklahoma [4]	0	8	34	47	1	2	56	37
Texas	0	10	30	11	5	11	36	11
Mountain States:								
Montana	7	1	10	26	0	0	9	5
Idaho	0	0	10	6	8	0	4	5
Wyoming	0	2	5	4	0	0	1	0
Colorado	1	4	12	8	0	1	1	19
New Mexico	4	2	7	9	0	1	14	19
Arizona	1	1	1	3	0	0	2	13
Utah [2]	0	0	6	11	1	0	4	1
Pacific States.								
Washington	10	1	26	40	5	10	4	12
Oregon	0	0	8	11	1	0	3	3
California	6	57	67	75	9	22	15	13

[2] Week ended Friday.
[3] Typhus fever, 1931, 11 cases: 1 case in Maryland, 2 cases in South Carolina, 6 cases in Georgia, and 2 cases in Florida.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September, 1931										
Alabama	5	299	13	373	28	110	10	156	8	127
Arizona	4	16	13	1	10	2	2	15	0	27
Connecticut	2	20	7	1	17		458	26	0	23
Indiana	5	56	46		28		12	112	31	66
Iowa	4	33			9		34	50	17	14
Maine	2	13	1		36		20	18	0	18
Michigan	24	73	4	1	59		577	285		97
North Dakota	4	5			7		11	15	6	17
Porto Rico		44	73	2,840	11		1		0	11

September, 1931

	Cases
Chicken pox:	
Alabama	21
Arizona	5
Connecticut	32
Indiana	21
Iowa	17
Maine	11
Michigan	85
North Dakota	9
Porto Rico	3
Conjunctivitis, infectious:	
Connecticut	1
Maine	1
Dengue:	
Alabama	1
Dysentery:	
Arizona	5
Connecticut (bacillary)	1
Porto Rico	45
Filariasis.	
Porto Rico	8

Disease and State	Cases
German measles:	
Arizona	1
Connecticut	9
Iowa	2
Maine	5
Lead poisoning:	
Connecticut	2
Leprosy:	
Porto Rico	1
Lethargic encephalitis:	
Alabama	4
Connecticut	3
Michigan	8
Mumps:	
Alabama	13
Arizona	7
Connecticut	26
Indiana	22
Iowa	19
Maine	17
Michigan	110
North Dakota	51
Porto Rico	12
Ophthalmia neonatorum:	
Arizona	1
Connecticut	1
Porto Rico	9
Paratyphoid fever:	
Connecticut	4
Porto Rico	1
Puerperal septicemia:	
Porto Rico	6
Rabies in animals:	
Connecticut	4
Rabies in man:	
Alabama	1
Septic sore throat:	
Connecticut	5
Iowa	1
Michigan	7
Tetanus:	
Connecticut	2
Maine	1
Porto Rico	5
Tetanus, infantile:	
Porto Rico	12
Trachoma:	
Arizona	29
North Dakota	2
Porto Rico	6
Trichinosis:	
Connecticut	1
Typhus fever:	
Alabama	5
Maine	18
Undulant fever:	
Alabama	1
Arizona	1
Indiana	1
Iowa	2
Maine	2
Michigan	1
North Dakota	1
Vincent's angina:	
Maine	5
North Dakota	48
Whooping cough:	
Alabama	81
Arizona	3
Connecticut	258
Indiana	120
Iowa	92
Maine	35
Michigan	848
North Dakota	83
Porto Rico	119

Cases of Certain Communicable Diseases Reported for the Month of May, 1931, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	166	23	68	246	145	0	75	6	103
New Hampshire		6			11	0		0	
Vermont	127	2	69	95	22	18	19	2	42
Massachusetts	1,138	152	2,239	644	1,542	0	491	21	626
Rhode Island	76	20	505	257	226	0	61	2	36
Connecticut	392	39	2,414	276	200	0	105	9	172
New York	2,716	536	12,902	1,744	3,650	32	1,755	72	1,920
New Jersey	1,827	166	4,190	296	1,160	6	489	15	933
Pennsylvania	2,458	297	16,967	1,778	2,600	0	627	45	853
Ohio	1,916	134	5,027	2,511	1,824	192	749	39	431
Indiana	364	81	4,501	205	913	541	931	11	344
Illinois	1,402	481	8,250	1,060	2,149	265	879	25	815
Michigan	1,439	137	787	812	1,697	81	543	16	1,087
Wisconsin	1,941	65	3,442	4,544	624	50	198	4	609
Minnesota	1,032	52	897		344	33	288	8	256
Iowa	186	24	271	105	237	274	34	1	108
Missouri	305	160	2,419	198	1,340	212	282	35	300
North Dakota	131	30	302	113	145	22	16	5	51
South Dakota	72	41	186	10	52	59	20	3	43
Nebraska	329	26	49	655	198	233	20	3	111
Kansas	335	46	497	557	170	284	136	10	176

Cases of Certain Communicable Diseases Reported for the Month of May, 1931, by State Health Officers—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Delaware	18	2	539	34	64	0	20	3	13
Maryland	330	47	4,589	313	287	0	[1] 221	24	258
District of Columbia	86	37	1,222		76	0	97	3	35
Virginia	642	67	3,605		159	13	217	39	461
West Virginia	284	33	646		190	27	75	27	274
North Carolina	445	60	3,996		169	13		17	846
South Carolina	392	82	674	152	28	6	183	47	304
Georgia	179	31	823	175	276	44	127	48	172
Florida	161	19	764	43	20	5	47	12	71
Kentucky [2]									
Tennessee	188	42	1,704	164	414	100	263	32	291
Alabama	148	44	1,110	102	100	56	582	38	92
Mississippi	694	33	260	331	78	184	155	45	450
Arkansas	109	10	212	67	50	106	[1] 27	27	68
Louisiana	108	74	22	8	84	74	[1] 163	49	19
Oklahoma [3]	208	42	183	31	108	280	59	24	60
Texas		97			147			39	
Montana	167	7	70	80	80	4	48	5	97
Idaho	39	0	22	16	52	10	1	6	109
Wyoming	35		6	72	45	2		0	32
Colorado	249	21	894	193	136	30	69	3	324
New Mexico	85	14	424	65	25	8	45	8	
Arizona	26	13	215	15	11	0	93	10	32
Utah [2]									
Nevada	22		88	4	1	0	1	0	
Washington	578	86	1,028	264	144	104	227	28	541
Oregon	222	81	424	255	74	90	59	8	75
California	1,710	304	4,780	1,145	554	93	834	45	1,166

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 100,000 Population (Annual Basis) for the Month of May, 1931

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	244	34	100	362	213	0	110	9	151
New Hampshire		15			28	0		0	
Vermont	415	7	225	310	72	59	62	7	137
Massachusetts	312	42	630	176	422	0	135	6	171
Rhode Island	128	34	852	434	381	0	103	8	61
Connecticut	282	28	1,739	199	144	0	76	6	124
New York	249	49	1,190	160	334	3	161	7	176
New Jersey	518	47	1,189	84	329	2	139	4	265
Pennsylvania	297	86	2,051	215	314	0	76	5	103
Ohio	334	23	876	438	318	33	131	7	84
Indiana	131	29	1,618	74	828	104	335	4	124
Illinois	212	73	1,235	161	326	40	133	4	123
Michigan	340	32	186	192	401	19	128	4	257
Wisconsin	768	26	1,362	1,798	247	20	78	2	241
Minnesota	470	24	408		157	15	131	4	117
Iowa	88	11	129	50	113	130	16	0	51
Missouri	98	52	779	64	431	68	91	11	97
North Dakota	225	52	519	194	249	38	28	9	88
South Dakota	121	69	313	17	88	99	34	5	72
Nebraska	279	22	42	556	168	198	17	3	94
Kansas	208	29	309	346	106	176	85	6	109
Delaware	88	10	2,641	167	314	0	98	15	64
Maryland	235	33	3,267	223	204	0	[1] 157	17	184
District of Columbia	205	88	2,919		182	0	232	7	84
Virginia	310	32	1,743		77	6	105	19	228
West Virginia	190	22	432		127	18	50	18	183
North Carolina	161	22	1,450		61	5		6	307
South Carolina	264	55	455	103	19	4	123	32	205
Georgia	72	13	333	71	112	18	51	19	70
Florida	124	15	588	33	15	4	86	9	55

[1] Pulmonary.

Case Rates per 100,000 Population (Annual Basis) for the Month of May, 1931—Continued

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Kentucky [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Tennessee	84	19	757	73	184	44	117	14	129
Alabama	65	19	487	45	44	25	255	17	40
Mississippi	401	19	150	191	45	103	90	26	260
Arkansas	69	6	134	42	32	67	[1] 17	17	43
Louisiana	59	41	12	4	46	41	[1] 90	27	10
Oklahoma [3]	117	24	103	17	61	157	33	13	34
Texas	-------	19	-------	-------	29	-------	-------	8	-------
Montana	366	15	153	175	175	9	105	11	212
Idaho	103	21	58	42	137	26	3	16	287
Wyoming	180	-------	31	870	231	10	-------	0	164
Colorado	280	24	1,005	217	153	34	78	3	364
New Mexico	232	38	1,158	178	68	22	123	22	-------
Arizona	68	34	565	39	29	0	244	26	84
Utah [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Nevada	279	-------	1,117	51	13	0	13	0	-------
Washington	428	27	762	196	107	77	168	21	401
Oregon	268	37	512	308	89	109	71	10	91
California	338	60	946	227	110	18	165	9	231

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,315,000. The estimated population of the 91 cities reporting deaths is more than 31,935,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended October 3, 1931, and October 4, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,726	1,228	------------
96 cities	856	377	600
Measles:			
45 States	451	644	------------
96 cities	116	116	------------
Meningococcus meningitis:			
46 States	49	77	------------
96 cities	20	32	------------
Poliomyelitis: 46 States	956	649	------------
Scarlet fever:			
46 States	1,607	1,686	------------
96 cities	419	450	463
Smallpox:			
46 States	105	175	------------
96 cities	1	5	2
Typhoid fever:			
46 States	1,049	933	------------
96 cities	135	124	143
Deaths reported			
Influenza and pneumonia: 91 cities	342	366	------------
Smallpox: 91 cities	0	0	------------

City reports for week ended October 3, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	1	----------	0	1	1	4
New Hampshire:								
Concord	0	0	0	----------	0	0	0	0
Manchester	0	0	0	----------	0	0	0	2
Nashua	0	0	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Massachusetts:								
Boston	5	16	12	3	1	2	2	8
Fall River	1	3	2	----------	0	4	0	1
Springfield	1	3	0	----------	0	0	3	1
Worcester	4	4	0	----------	0	0	11	8
Rhode Island:								
Pawtucket	0	1	0	----------	0	0	0	1
Providence	0	4	5	----------	0	3	1	3
Connecticut:								
Bridgeport	1	3	0	----------	0	0	0	2
Hartford	0	2	1	----------	0	0	0	0
New Haven	0	0	0	----------	0	0	4	1
MIDDLE ATLANTIC								
New York.								
Buffalo	2	9	2	----------	0	0	0	10
New York	13	88	41	10	3	10	17	98
Rochester	1	2	1	----------	0	3	2	0
Syracuse	0	1	0	----------	0	0	0	0
New Jersey:								
Camden	0	3	0	----------	0	0	0	0
Newark	1	10	2	2	0	0	0	3
Trenton	0	1	0	----------	0	0	3	1
Pennsylvania:								
Philadelphia	4	33	1	8	3	1	4	16
Pittsburgh	3	13	8	----------	0	12	8	11
Reading	1	1	0	----------	0	0	0	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	0	6	4	----------	1	0	0	5
Cleveland	8	31	2	2	1	3	12	10
Columbus	1	4	15	----------	0	1	1	1
Toledo	0	5	3	----------	0	4	0	8
Indiana:								
Fort Wayne	0	1	3	----------	0	0	0	0
Indianapolis	0	8	1	----------	1	1	1	3
South Bend	0	1	1	----------	0	0	0	1
Terre Haute	1	0	1	----------	0	0	0	1
Illinois:								
Chicago	8	67	39	1	1	6	10	26
Springfield	1	0	0	----------	0	0	0	1

City reports for week ended October 3, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Michigan:								
Detroit	1	39	7	2	0	2	5	5
Flint	0	2	0		0	0	3	2
Grand Rapids	3	1	0		0	1	0	0
Wisconsin:								
Kenosha	0	0	0		0	0	4	0
Madison	0	2	0			1	5	
Milwaukee	9	7	0		0	5	10	3
Racine	1	0	0		0	0	4	0
Superior	0	0	0		0	1	2	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	1	0	0		0	0	0	1
Minneapolis	17	21	7		2	1	18	1
St. Paul	3	9	3		0	0	0	2
Iowa:								
Davenport	0	1	0			0	0	
Des Moines	0	2	1			0	0	
Sioux City	0	1	3			0	1	
Waterloo	0	0	0			0	0	
Missouri:								
Kansas City	3	4	2		0	0	2	3
St. Joseph	0	0	3		0	0	0	2
St. Louis	2	24	14			0	0	4
North Dakota:								
Fargo	0	1	0		0	0	0	1
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	16	0	0			5	0	
Nebraska:								
Omaha	0	8	12		0	0	1	4
Kansas:								
Topeka	0	1	1		2	0	3	1
Wichita	2	2	0		0	4	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	0	0	3
Maryland:								
Baltimore	4	17	13	1	0	1	6	9
Cumberland	0	0	0		0	0	0	0
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	1	11	9		0	0	0	5
Virginia:								
Lynchburg	0	3	5		0	0	0	0
Norfolk	0	2	0		0	0	1	1
Richmond	0	17	14		0	0	0	2
Roanoke	0	3	10		0	0	0	1
West Virginia:								
Charleston	0	1	0	1	0	0	0	0
Wheeling	1	0	0		0	0	0	1
North Carolina:								
Raleigh	0	3	1		0	0	0	1
Wilmington	0	1	1		0	0	0	0
Winston-Salem	0	4	13		0	0	2	0
South Carolina:								
Charleston	0	1	1	7	0	0	0	2
Columbia	0	1	0		0	0	0	5
Greenville	0	2	2		0	0	0	0
Georgia:								
Atlanta	0	7	6	4	0	0	0	2
Brunswick	0	0	0		0	0	1	0
Savannah	0	1	2	3	0	0	0	0
Florida:								
Miami	0	2	0		0	17	1	1
Tampa	0	1	1		0	0	0	0

City reports for week ended October 3, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	1	—	0	0	0	0
Tennessee:								
Memphis	0	5	15	—	0	0	0	7
Nashville	0	3	1	—	0	0	0	0
Alabama:								
Birmingham	0	4	3	—	1	0	0	3
Mobile	0	1	4	—	0	0	0	0
Montgomery	0	3	0	—	—	5	2	—
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	3	—	—	1	0	—
Little Rock	0	0	0	—	0	0	0	1
Louisiana:								
New Orleans	0	8	7	—	0	0	0	8
Shreveport	0	1	3	—	0	3	0	0
Oklahoma:								
Muskogee	0	0	13	—	0	0	0	0
Oklahoma City	0	2	3	—	0	0	0	2
Tulsa	1	2	38	—	—	0	1	—
Texas:								
Dallas	0	10	7	—	0	0	0	1
Fort Worth	0	2	5	—	0	0	0	0
Galveston	0	0	0	—	0	0	0	1
Houston	0	5	8	—	0	0	0	5
San Antonio	0	2	4	—	0	1	0	3
MOUNTAIN								
Montana:								
Billings	0	0	0	—	0	2	0	0
Great Falls	0	0	0	—	0	0	0	0
Helena	0	0	0	—	0	1	0	0
Missoula	0	1	0	—	0	0	0	1
Idaho:								
Boise	1	1	0	—	0	0	1	0
Colorado:								
Denver	5	8	7	—	0	1	0	2
Pueblo	0	0	0	—	0	0	0	0
New Mexico:								
Albuquerque	1	0	1	—	0	0	0	1
Arizona:								
Phoenix	0	1	0	—	0	0	0	1
Utah:								
Salt Lake City	4	2	2	—	0	0	0	2
Nevada:								
Reno	0	0	0	—	0	0	0	2
PACIFIC								
Washington:								
Seattle	12	3	0	—	—	5	3	—
Spokane	—	2	—	—	—	—	—	—
Tacoma	0	2	0	—	0	0	1	4
Oregon:								
Portland	12	5	0	—	0	2	4	0
Salem	0	0	0	—	0	0	0	0
California:								
Los Angeles	9	21	19	14	0	12	1	7
Sacramento	0	2	0	—	0	10	0	2
San Francisco	14	10	2	3	0	13	0	9

City reports for week ended October 3, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	1	1	0	0	0	0	1	0	0	2	14
New Hampshire:											
Concord	0	2	0	0	0	0	0	0	0	0	8
Manchester	1	0	0	0	0	1	0	0	0	0	35
Nashua	0	1	0	0	0	0	0	0	0	0	--------
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	0	2
Massachusetts:											
Boston	24	22	0	0	0	9	3	1	0	16	207
Fall River	2	7	0	0	0	2	1	0	0	2	24
Springfield	2	5	0	0	0	2	0	0	0	2	35
Worcester	5	13	0	0	0	1	0	0	0	9	38
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	16
Providence	2	3	0	0	0	2	1	4	0	4	56
Connecticut:											
Bridgeport	2	1	0	0	0	0	0	0	0	0	19
Hartford	1	0	0	0	0	3	0	2	0	4	35
New Haven	1	1	0	0	0	3	0	0	0	3	29
MIDDLE ATLANTIC											
New York:											
Buffalo	8	20	0	0	0	11	2	0	0	16	122
New York	36	25	0	0	0	79	32	19	3	166	1,154
Rochester	2	11	0	0	0	1	2	2	0	3	63
Syracuse	2	4	0	0	0	7	0	0	0	16	29
New Jersey:											
Camden	2	3	0	0	0	0	1	0	0	2	22
Newark	5	8	0	0	0	10	2	2	0	79	74
Trenton	1	2	0	0	0	2	0	1	0	0	19
Pennsylvania:											
Philadelphia	27	32	0	0	0	22	11	20	0	91	363
Pittsburgh	17	8	0	0	0	10	3	4	1	35	125
Reading	0	0	0	0	0	0	0	0	0	0	34
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	8	17	0	0	0	9	2	3	0	1	118
Cleveland	15	12	0	0	0	12	3	1	1	73	176
Columbus	4	8	0	0	0	4	1	1	0	2	63
Toledo	5	6	0	0	0	4	1	5	0	31	79
Indiana:											
Fort Wayne	1	0	0	0	0	0	1	0	0	3	19
Indianapolis	6	0	0	0	0	9	2	0	0	0	--------
South Bend	2	1	0	0	0	2	0	0	0	2	18
Terre Haute	1	0	0	0	0	0	0	1	0	0	15
Illinois:											
Chicago	45	31	0	0	0	36	6	2	1	101	569
Springfield	1	1	0	0	0	1	0	0	0	0	18
Michigan:											
Detroit	36	17	0	0	0	18	4	5	2	116	217
Flint	7	3	0	0	0	0	0	0	0	8	12
Grand Rapids	6	4	0	0	0	1	1	0	0	0	24
Wisconsin:											
Kenosha	0	0	0	0	0	1	0	0	0	0	4
Madison	1	0	0	0	--------	--------	0	0	--------	3	--------
Milwaukee	10	5	0	0	0	3	1	1	0	52	97
Racine	3	2	0	0	0	0	0	0	0	1	8
Superior	1	1	0	0	0	1	0	0	0	0	6

City reports for week ended October 3, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL											
Minnesota:											
Duluth	4	0	0	0	0	0	0	0	0	0	18
Minneapolis	21	15	0	0	0	3	1	1	0	6	78
St. Paul	11	4	0	0	0	3	1	0	0	10	45
Iowa:											
Davenport	0	2	0	2	--------	--------	0	0	--------	0	--------
Des Moines	3	3	0	1	--------	--------	0	0	--------	0	29
Sioux City	2	4	0	0	--------	--------	1	0	--------	2	--------
Waterloo	2	--------	0	--------	--------	--------	0	--------	--------	--------	--------
Missouri:											
Kansas City	6	3	0	0	0	11	2	0	0	5	81
St. Joseph	1	1	0	0	0	2	0	1	0	1	22
St. Louis	16	12	0	0	0	7	5	3	0	39	157
North Dakota:											
Fargo	2	2	0	0	0	0	0	0	0	3	5
Grand Forks	1	0	0	0	--------	--------	0	0	--------	0	--------
South Dakota:											
Aberdeen	1	2	0	0	--------	--------	0	0	--------	8	--------
Nebraska:											
Omaha	2	4	0	1	0	3	0	1	0	1	52
Kansas:											
Topeka	2	2	0	0	0	1	0	1	0	0	26
Wichita	2	2	0	0	0	0	0	0	0	1	17
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	0	0	0	0	1	0	0	0	0	22
Maryland:											
Baltimore	8	4	0	0	0	21	8	4	0	104	168
Cumberland	0	0	0	0	0	2	1	0	0	0	12
Frederick	0	0	0	0	0	0	0	0	0	0	3
District of Col.:											
Washington	8	6	0	0	0	9	3	0	0	10	128
Virginia:											
Lynchburg	1	0	0	0	0	1	1	2	1	0	11
Norfolk	1	2	0	0	0	2	0	0	0	5	--------
Richmond	5	15	0	0	0	4	1	2	0	0	44
Roanoke	2	1	0	0	0	1	0	1	0	0	10
West Virginia:											
Charleston	2	1	0	0	0	2	1	[1] 14	1	3	30
Wheeling	2	0	0	0	0	0	0	2	0	1	24
North Carolina:											
Raleigh	1	0	0	0	0	2	0	0	0	2	17
Wilmington	1	0	0	0	0	1	0	0	0	1	12
Winston-Salem	4	1	0	0	0	1	1	0	0	2	17
South Carolina:											
Charleston	0	1	0	0	0	5	2	0	0	0	28
Columbia	1	1	0	0	0	3	0	0	0	0	27
Greenville	0	0	0	0	0	0	0	0	0	0	--------
Georgia:											
Atlanta	6	0	0	0	0	3	2	7	5	0	72
Brunswick	0	0	0	0	0	0	0	0	0	0	6
Savannah	0	0	0	0	0	3	1	0	0	2	28
Florida:											
Miami	0	0	0	0	0	2	1	1	0	0	22
Tampa	0	0	0	0	0	0	0	1	0	3	16
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	0	0	0	0	0	0	1	0	0	12
Tennessee:											
Memphis	3	5	0	0	0	9	4	2	0	14	78
Nashville	2	0	0	0	0	3	3	4	0	1	41

[1] 13 cases nonresidents.

City reports for week ended October 3, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST SOUTH CENTRAL—con.											
Alabama:											
Birmingham	6	3	0	0	0	1	2	2	0	3	60
Mobile	1	1	0	0	0	1	0	0	0	0	21
Montgomery	1	3	0	0			1	0		4	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0			0	0		0	
Little Rock	2	1	0	0	0	2	1	0	1	0	5
Louisiana:											
New Orleans	3	2	0	0	0	11	3	4	1	0	102
Shreveport	1	1	0	0	0	0	0	0	1	3	36
Oklahoma:											
Muskogee	0	0	0	0	0	0	0	1	0	0	
Oklahoma City	3	1	1	0	0	2	2	0	0	0	23
Tulsa	4	2	0	0			1	0		0	
Texas:											
Dallas	3	7	0	0	0	1	2	1	0	4	36
Fort Worth	1	9	0	0	0	2	1	5	0	0	24
Galveston	1	0	0	0	0	0	0	0	0	0	8
Houston	1	0	0	0	0	4	1	2	0	0	59
San Antonio	1	0	0	0	0	9	1	0	0	0	68
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	1	7
Great Falls	1	0	0	0	0	0	0	0	0	1	2
Helena	0	0	0	0	0	0	0	0	0	0	4
Missoula	0	1	1	0	0	0	0	1	0	0	3
Idaho:											
Boise	0	1	0	0	0	0	1	0	1	0	7
Colorado:											
Denver	6	8	0	0	0	4	2	1	1	5	66
Pueblo	0	0	0	0	0	0	1	1	0	0	10
New Mexico:											
Albuquerque	0	0	0	0	0	0	2	6	0	0	6
Arizona:											
Phoenix	1	1	0	0	0	2	0	0	0	0	
Utah:											
Salt Lake City	2	1	0	0	0	2	2	0	0	1	26
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	8
PACIFIC											
Washington:											
Seattle	7	7	0	0			2	1		0	
Spokane	3		1				1				
Tacoma	1	2	1	0	0	0	1	0	0	6	20
Oregon:											
Portland	4	5	2	3	0	2	1	2	0	0	72
Salem	0	0	1	0	0	0	1	0	0	0	
California:											
Los Angeles	12	21	0	0	0	18	3	4	0	17	216
Sacramento	2	1	0	0	0	4	1	1	0	0	24
San Francisco	8	5	0	0	0	13	1	1	0	9	157

City reports for week ended October 3, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	5	0
New Hampshire:									
Concord	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	1	1	0	0	0	0	4	31	4
Fall River	0	0	0	0	0	0	0	2	0
Springfield	0	0	0	0	0	0	0	10	3
Worcester	0	0	0	0	0	0	0	3	1
Rhode Island:									
Providence	2	1	0	0	0	0	0	4	0
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	12	1
Hartford	0	0	0	0	0	0	1	6	0
New Haven	0	0	0	0	0	0	0	7	0
MIDDLE ATLANTIC									
New York:									
New York	4	2	0	0	0	0	15	140	10
Rochester	0	0	0	0	0	0	1	2	0
Syracuse	0	0	0	0	0	0	1	1	0
New Jersey:									
Newark	0	0	0	0	0	0	1	7	0
Pennsylvania:									
Philadelphia	0	0	0	0	0	0	1	8	0
Pittsburgh	1	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Toledo	0	0	0	0	0	0	0	1	1
Indiana:									
Fort Wayne	0	0	0	0	0	0	0	2	0
Illinois[1]									
Chicago	3	2	1	0	0	0	4	13	1
Michigan:									
Detroit	0	0	0	0	0	0	4	9	0
Flint	0	0	0	0	0	0	0	2	0
Grand Rapids	0	0	0	0	0	0	1	1	0
Wisconsin:									
Kenosha	0	0	0	0	0	0	0	2	0
Madison	1	0	0	0	0	0	0	4	0
Milwaukee	0	0	0	0	0	0	0	2	2
Racine	0	0	0	0	0	0	0	3	0
Superior	0	0	0	0	0	0	0	4	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	2	0
Minneapolis	0	0	0	0	0	0	2	12	0
St. Paul	0	0	0	0	0	0	0	20	0
Missouri:									
St. Louis	1	0	1	0	0	0	0	2	1
North Dakota:									
Fargo	0	0	0	0	0	0	0	1	0

[1] Typhus fever, 3 cases: 1 case at Springfield, Ill., and 2 cases at Savannah, Ga.

City reports for week ended October 3, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	1	0	0	0	1	1	1
District of Columbia:									
Washington	0	0	0	0	0	0	1	4	0
Virginia									
Richmond	0	0	0	1	0	0	1	0	0
West Virginia:									
Charleston	2	1	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	1	0	0	0	0
Winston-Salem	0	0	0	0	1	1	0	0	0
South Carolina:									
Charleston	0	0	1	0	0	0	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Georgia:									
Savannah [1]	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	0	0	0	0	0	1	2	0
Nashville	0	1	0	0	0	0	1	0	0
Alabama:									
Birmingham	1	1	0	0	0	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
New Orleans	1	0	0	0	0	0	0	0	0
Texas:									
Dallas	0	0	0	0	2	2	0	0	0
Fort Worth	0	0	0	0	0	1	0	0	0
Galveston	0	0	0	0	0	1	0	0	0
MOUNTAIN									
New Mexico:									
Albuquerque	0	0	0	0	0	0	0	1	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	1	0	0
Tacoma	1	0	0	0	0	0	1	1	0
California:									
Los Angeles	1	0	0	0	0	0	2	0	0
San Francisco	1	1	1	1	1	0	1	1	0

[1] Typhus fever, 3 cases: 1 case at Springfield, Ill., and 2 cases at Savannah, Ga.

The following tables give the rates per 100,000 population for 98 cities for the 5-week period ended October 3, 1931, compared with those for a like period ended October 4, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, August 30 to October 3, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Sept 5, 1931	Sept 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930
98 cities	36	40	35	44	34	46	45	56	[2] 56	60
New England	55	39	58	60	36	34	38	56	50	53
Middle Atlantic	24	29	26	26	22	36	25	31	25	40
East North Central	38	48	32	63	29	74	42	74	44	79
West North Central	23	35	34	56	42	48	71	58	[3] 88	60
South Atlantic	34	66	45	63	73	46	67	100	150	68
East South Central	81	48	99	24	93	24	128	30	140	102
West South Central	105	56	41	45	57	63	101	136	108	104
Mountain	52	44	26	35	17	26	52	62	78	9
Pacific	27	32	29	22	29	12	41	26	[4] 43	51

MEASLES CASE RATES

	Sept 5, 1931	Sept 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930
98 cities	19	24	14	16	22	16	15	18	[2] 18	19
New England	58	36	29	41	31	19	31	46	24	30
Middle Atlantic	14	27	8	19	18	16	9	13	12	12
East North Central	11	12	13	9	17	14	16	13	12	5
West North Central	8	31	11	15	13	19	4	29	[3] 10	70
South Atlantic	8	28	6	6	14	22	8	10	2	22
East South Central	6	24	6	6	0	0	0	66	29	0
West South Central	10	0	10	3	17	0	3	10	17	7
Mountain	52	53	35	35	122	44	44	26	35	70
Pacific	67	34	45	16	53	18	51	16	[4] 82	22

SCARLET FEVER CASE RATES

	Sept 5, 1931	Sept 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930
98 cities	48	42	49	50	57	61	57	71	[2] 66	71
New England	87	60	106	56	87	77	53	87	132	80
Middle Atlantic	37	24	30	26	43	45	45	32	51	46
East North Central	56	47	64	84	62	90	62	117	62	106
West North Central	27	58	36	35	59	45	65	77	[3] 95	72
South Atlantic	51	72	55	56	71	44	67	62	50	76
East South Central	87	60	64	36	81	36	93	114	70	66
West South Central	54	63	41	24	47	52	34	52	37	35
Mountain	26	35	61	79	87	70	122	97	96	115
Pacific	43	28	39	63	55	67	71	75	[4] 74	73

SMALLPOX CASE RATES

	Sept 5, 1931	Sept 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930
98 cities	1	3	1	3	1	4	0	3	[2] 0	1
New England	0	0	2	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	4	2	2	2	1	9	0	2	0	1
West North Central	4	14	6	27	0	21	6	14	[3] 2	0
South Atlantic	0	4	0	0	0	0	0	0	0	2
East South Central	0	0	6	0	0	0	0	0	0	0
West South Central	0	0	0	0	0	0	0	3	0	3
Mountain	0	0	0	0	0	0	0	0	0	0
Pacific	2	12	0	8	4	4	0	16	[4] 0	0

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] Waterloo, Iowa, and Spokane, Wash., not included.
[3] Waterloo, Iowa, not included.
[4] Spokane, Wash., not included.

Summary of weekly reports from cities, August 30 to October 3, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930
98 cities	20	21	23	26	42	22	21	17	[2] 21	20
New England	7	12	7	22	22	12	5	12	17	12
Middle Atlantic	13	20	13	24	16	15	16	13	21	14
East North Central	16	12	10	17	91	11	15	9	9	9
West North Central	6	14	13	21	38	29	36	15	[3] 14	14
South Atlantic	49	58	79	70	26	68	43	56	65	42
East South Central	41	48	35	48	47	48	47	18	52	60
West South Central	74	45	91	52	44	63	47	35	24	52
Mountain	44	9	35	62	26	0	26	44	26	115
Pacific	10	8	27	4	35	14	10	12	[4] 14	16

INFLUENZA DEATH RATES

	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930
91 cities	2	3	4	3	3	3	2	2	3	2
New England	2	0	2	0	2	2	0	2	2	0
Middle Atlantic	1	3	4	4	3	2	1	2	3	1
East North Central	1	2	3	3	3	2	3	2	2	0
West North Central	3	6	9	0	6	0	0	0	12	2
South Atlantic	2	8	2	2	4	0	4	4	0	2
East South Central	6	0	0	19	0	26	6	13	6	13
West South Central	10	11	17	0	0	7	0	4	0	11
Mountain	0	9	0	0	0	18	0	0	0	18
Pacific	2	0	2	0	2	0	0	5	0	2

PNEUMONIA DEATH RATES

	Sept. 5, 1931	Sept. 6, 1930	Sept. 12, 1931	Sept. 13, 1930	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930
91 cities	50	53	55	54	60	57	52	57	53	58
New England	24	56	58	68	50	56	67	39	58	44
Middle Atlantic	62	65	65	63	66	65	55	72	60	59
East North Central	33	36	36	43	45	42	38	47	35	53
West North Central	62	51	44	45	44	75	44	36	59	69
South Atlantic	61	68	63	58	57	56	51	56	61	52
East South Central	38	91	82	26	57	71	32	65	68	104
West South Central	83	50	73	57	93	46	52	71	66	71
Mountain	96	53	70	123	78	115	70	53	61	132
Pacific	19	27	46	25	84	40	86	40	53	40

[2] Waterloo, Iowa, and Spokane, Wash., not included.
[3] Waterloo, Iowa, not included.
[4] Spokane, Wash., not included.

FOREIGN AND INSULAR

CANADA

Quebec Province—Communicable diseases—Week ended September 26, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended September 26, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	36	Poliomyelitis	105
Diphtheria	47	Scarlet fever	47
Erysipelas	2	Tuberculosis	39
German measles	3	Typhoid fever	23
Measles	16	Whooping cough	24
Mumps	11		

CHINA

Shansi Province—Vital statistics—Year 1923.—According to the Nankai Weekly Statistical Service for July 13, 1931, published by the Institute of Economics of Nankai University at Tientsin, deaths from certain diseases occurred in the Province of Shansi during 1923 as shown in the table below. Evidently 1923 is the latest year for which such statistics for the Province have been published. The population in 1923 was given as 11,799,109.

Disease	Number of deaths	Death rate per 100,000 population	Disease	Number of deaths	Death rate per 100,000 population
Cholera	2,732	23.2	Measles	21,625	183.3
Diphtheria	6,647	65.3	Smallpox	8,203	69.5
Dysentery	7,691	64.4	Tuberculosis	15,108	128.1
Malaria	834	7.1			

The following table shows the number of births and deaths, the birth and death rates per 1,000 population, and the rate of natural increase in Shansi Province for the years 1912 to 1923:

Year	Births		Deaths		Natural increase rate
	Number	Rate per 1,000 population	Number	Rate per 1,000 population	
1912	343,015	34.0	218,333	21.7	12.3
1913	327,676	32.0	193,791	18.9	13.1
1914	348,648	33.4	142,573	13.6	19.8
1915	448,173	43.3	246,534	23.8	19.5
1916	639,983	60.8	421,876	40.1	20.7
1917	705,213	62.5	245,50[illegible]	21.7	40.8
1918	566,153	55.7	242,813	23.9	31.8
1919	143,902	12.3	167,374	14.1	−1.8
1920	153,035	13.4	132,090	11.5	1.9
1921	150,410	12.9	134,977	11.6	1.3
1922	170,634	15.1	160,908	13.7	1.4
1923	180,3[illegible]9	15.3	136,709	11.6	3.7

CUBA

Provinces—Communicable diseases—Four weeks ended August 29, 1931.—During the four weeks ended August 29, 1931, cases of certain communicable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Chicken pox		2	2			47	51
Diphtheria		5	1	3	4	3	16
Malaria		6		2	4	34	46
Measles		52	4	14			70
Paratyphoid fever		4	1	1		1	7
Scarlet fever		2	1	1			4
Typhoid fever	3	23	10	47	9	29	121

DENMARK

Communicable diseases—August, 1931.—During the month of August, 1931, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Anthrax	2	Mumps	89
Cerebrospinal meningitis	5	Paratyphoid fever	31
Chicken pox	13	Poliomyelitis	5
Diphtheria and croup	217	Scabies	601
Erysipelas	232	Scarlet fever	210
German measles	2	Syphilis	106
Gonorrhea	966	Tetanus	1
Influenza	2,952	Typhoid fever	8
Lethargic encephalitis	3	Undulant fever (*Bacillus abortus*, Bang)	51
Measles	799	Whooping cough	1,496

PANAMA CANAL ZONE

Communicable diseases—August, 1931.—During the month of August, 1931, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	3		Measles	44	1
Diphtheria	5		Mumps	1	
Dysentery, amebic	4		Pneumonia		9
Dysentery, bacillary		1	Tuberculosis		24
Leprosy	1		Typhoid fever	4	
Malaria	236		Whooping cough	16	

TASMANIA

Vital statistics—1930.—According to statistics published by the Commonwealth Bureau of Census and Statistics, at Hobart, Tasmania, births occurring during 1930 numbered 4,785 and deaths

1,948. There were 242 deaths of infants under 1 year of age, a rate of 50.6 per 1,000 births. The birth and death rates per 1,000 population in the urban and rural sections of Tasmania during the years 1920–1929, 1929, and 1930 are given in the accompanying table. The population of Tasmania in 1928 was approximately 215,000.

	1930	1929	1920–1929
Births per 1,000 population.			
Urban districts	19.3	19.6	22.7
Rural districts	24.4	24.6	26.2
Total	22.2	22.4	24.8
Deaths per 1,000 population:			
Urban districts	10.8	11.4	11.5
Rural districts	7.7	9.3	8.5
Total	9.0	10.2	9.8

Cases of certain communicable diseases occurred in Tasmania during 1930, as compared with 1928 and 1929, as follows:

Disease	1930	1929	1928
Diphtheria	572	488	909
Puerperal fever	27	25	21
Scarlet fever	486	314	189
Syphilis	26	34	29
Tuberculosis	203	177	208
Typhoid fever	27	49	53

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended—														
					July, 1931				August, 1931					September, 1931				October, 1931	
					4	11	18	25	1	8	15	22	29	5	12	19	26	3	10
Ceylon: Colombo	C		1	1					1	1	1								
	D		1	1					1	1	1								
China:																			
Canton	C	1	2	1									1	1					
	D		1																
Shanghai	C					1				1	5	1	1	3	4	36			
Swatow	C			10	7														
Tientsin	C		1	10															
	D		1	1															
India	C	11,462	13,604	18,001	4,737	5,002	5,707	6,628	7,357	9,848	9,817	9,492							
	D	5,767	7,270	10,337	2,677	2,848	3,064	3,504	4,029	5,584	5,411	5,252							
Bombay	C	2				1	11	11	9	18	6	11	27	5	5	5			
	D	1					6	10	4	9	7	5	9	5	2	1			
Calcutta	C	310	265	292	72	62	55	48	42	27	20	21	10	3	15				
	D	176	149	168	35	34	58	28	10	7	7	6	4	2	3				
Karikal	C	19	12								1		1			1			
	D	14	7								1		1			1			
Madras	C	26	52	9	2	2			1		2	3	3	1	1				
	D	13	17	4															
Moulmein	C						1												
	D						1												
Negapatam	D												1						
Rangoon	C		2	4		1	2	1		1	1						1		
	D		1	2			1			1	1						1		
Vizagapatam	C			1															
India (French):																			
Chandernagor	C	6	4	3	1	1	1	2	1	4	2			1					
	D	5	4	3		1			1	4	2			1					
Pondicherry	C	24	17	3		1	1	1	1	1	1		2			2			
	D	4	7	3		1	1	1	1		1		1			1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10
India (Portuguese)	C			1		2				1									
	D					1				1									
Indo-China (see also table below):																			
Cochin-China—Rachgia	C								P										
Pnompenh	C	2		1		1	4			1		1			1	1			
	D	1	2	1		1	1			1					1	1			
Saigon and Cholon	C	27	104	61	8	3	5												
	D	22	76	41	3	2	2												
Iraq:																			
Abulkhasib	C												6						
	D												5						
Amara	C											2	22	35	8	1			
	D											1	21	30	7	1			
Amara Province	C												6	11	106	73	32	21	
	D												5	4	67	44	29	24	
Basra	C								3	9	263	272	148		54	91	77	19	
	D								2	8	140	157	76		20	18	34	11	
Basra Province	C											5	14	6	10	23	26	14	
	D											2	10	3	7	10	9	8	
Dinwaniyah	C																1		
Dinwaniyah Province	C																15	8	
	D																11	6	
Iwaniyah	C																22		
	D																15		
Muntafiq Province	C												10	21	66	128	55	54	
	D												8	20	42	75	38	57	
Nasiriyah	C													22	50	16	4	4	
	D													15	40	20	3	4	
Suqelshuyukh	C												2						
	D												2						
Persia: Rafsanjan [1]	C		36																
	D		14																

Philippine Islands:[2] Provinces—																			
Capiz	C	29	17	4										9	9	17	49	21	5
	D	24	15	4										5	6	5	35	16	5
Cebu	C									1	1	1							
	D									1	1	1							
Iloilo	C			26	24	3													
	D			21	22	3													
Negros, Occidental	C			2															
	D			1															
Pampanga	C		1																
Siam	C	16	14	4	1	1		1				1	1						
	D	4	5	2		1							1						
Bangkok	C	3	3	1	1			3				1	1						
	D	2	1	1				2											
On vessel:																			
S. S. Arankola, at Rangoon from Calcutta	C		1																
S. S. City of Eastborne, at Calcutta from Cocanada	C			1															
S. S. Tairea, at Penang from Calcutta	C			1															
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C							1											
	D							1											
S. S. Kohistan, at Basra from Bushire, Persia	C							2											
S. S. Cathay, at Kobe, Japan, from Shanghai	C											4							
	D											1							
S. S. Kasagi Maru, at Moji from Shanghai	C													1					
S. S. Ankoo, at Nagasaki from Shanghai	C														2				
	D														1				

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			Aug. 1-10, 1931
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	
Indo-China (French) (see also table above):														
Cambodia [3]	C	125	100	113	33	44	40	83	96	129	72	82	87	12
	D	80	29	70	20	22	21	45	64				60	2
Cochin-China [3]	C	29	105	107	47	52	75	71	69		66	30	47	39
	D	18	73	74	36	40	57	52	54				42	32

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931				August, 1931					September, 1931				October, 1931	
					4	11	18	25	1	8	15	22	29	5	12	19	26	3	10
Algeria:																			
Algiers	C								2										
Bone	C			1															
Philippeville	C						1				1	1							
	D						1				1								
Argentina: San Juan Province	C						P	P											
Belgian Congo	C			1															
	D			1															
British East Africa (see also table below):																			
Tanganyika	C	18	46	17			6				8								
	D	21	30	10			6				2								
Uganda	C	35	138	298	95	132	98	93	71	93	69								
	D	32	126	286	94	129	96	90	71	93	68								
Ceylon: Colombo	C	4	3	2				1	4	1	1			1	1	1		1	1
	D	3	3	2				1	4	1	1			1	1	1		1	1
Plague-infected rats		1	5						1	3	4								
China: [1]																			
Amoy [1]	C		1																
	D		1																
Dutch East Indies:																			
Batavia and West Java	C	74	59	116	21	18	19	17	12	11	20	15	19						
	D	71	59	66	21	18	19	17	12	11	20	15	19						
East Java and Madura	C	1	1																
	D	1	1																
Java and Madura	D	243	176	192	59	55	52	66	38	53	67	47	58						
Egypt:																			
Alexandria	C			4	1	1	2	9	4	3	1	1	2	2		1	1		
	D			4	1			4	1	2			1	1					
Assiout	C	32	18	11															
	D	17	7	1															
Beni-Suef	C	12	5																
	D	3	3																
Beheira	C								1		1			2					
Dakahlia	C						1			2									
Deirout	C	3	10	3															
	D	1	4	1															
Gharbieh	C			1															
	D			1															
Girga	C	44	7		1														
	D	22	2																

Kena	C	3	1																
	D	1	1																
Minieh	C	1	6	3	10		2												
	D		3	1	2		1	1											
Port Said	C			3	1	1	2	1	2										
	D		1	2	1														
Tanta	C										2			1		1			
Hawaii Territory:																			
Hawaii—Hamakua—Plague-infected rats			1								1								
Maui Island—																			
Haliimaile—Plague-infected rats																1			
Kula District	C									1									
	D									1									
Makawao—Plague-infected rats																1			
India	C	6,142	752	88	30	29	78	84	164	175	130	215							
	D	5,199	692	51	15	13	42	58	94	117	92	137							
Bassein	C	1	1		1			3		1		1		1	2	1	1		
	D	1	1		1			2		1		1		1	2	1	1		
Bombay	C	11	8		1	1	11												
	D	11	6				6												
Plague-infected rats		137	94	37	11	16	9	12	8	13	17	9	23	17	7	10	9		
Burma	C						7	9											
	D						5	5											
Calcutta	C	2																	
	D	2																	
Madras Presidency	C	3	2	6	1	2	8	10					9	6	39				
	D	2	1	1		1	1	7					4	5	20				
Moulmein	C					1	1	7					P	5					
	D						1							4	3	2	2		
Rangoon	C	1	2	1			2		1				2	1					
	D	1	2	1			1		1				1	1					
Plague-infected rats		4	7	3	1	2	2	1	1		1	1	1	1	1	1	1		
Indo-China (see also table below): Pnompenh	C			3															
	D	4		2															
Iraq:																			
Baghdad	C	23	23	23	1	1	1				1			2	1				
	D	8	9	9	1		1							1					
Maudhan	C		2																
Madagascar (see also table below): Tamatave	C								1						2				
Morocco	C																10		
Nigeria: Lagos	C	5																	
	D	5																	
Plague-infected rats		6																	
Peru (see table below).																			
Senegal (see table below).																			
Siam	C	1	2	1														1	
	D	1	2	1														1	
Spain: Hospitalet—Barcelona Province	C											5	1			1	1	1	
	D											2				1			
Syria: Beirut	C					1		1			1				1			2	

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April; and on September 19, 1931, 18 deaths were reported in Changchuanper and new cases in Kaitung and Fengtien.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10
Tunisia: Tunis	C	16	16	11														1	
	D	8	3	1															
Union of South Africa: Cape Province	C	3																	
	D	3																	
Plague-infected rats											1								
Orange Free State	C	2	2																
	D	2	2																

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
British East Africa (see also table above):							
Kenya	C	345	245	154	484	197	
Indo-China (see also table above)	C	11		2	1		1
	D	2		2	1		
Madagascar (see also table above):							
Ambositra Province	C	30	10	15	1		
	D	29	18	15	1		
Antsirabe Province	C	48	7	12	13		
	D	47	7	12	12		
Miarinarivo Province	C	6	2		8		
	D	6	2		7		
Moramanga Province	C		2	1	1		
	D		2				
Tananarive Province	C	41	18	10	5		
	D	40	18	9	5		
Peru	C	8	2	5	2		
	D	1		1			
Senegal:							
Baol [1]	C		4		27	101	13
	D		3		13	58	8
Dakar [1]	C	2	63	64	•95	194	38
	D	1	49	56	73	106	21
Diourbel [1]	C						9
	D						3
Louga [1]	C	1	5	4	3	2	4
	D		2	2	1	1	1
Rufisque [1]	C		1	2	34	2	1
Thies [1]	C			12	16	23	12
	D			3	7	16	8
Tivaouane [1]	C	4	19	3	3		
	D		11	2	2		

[1] Reports incomplete.

SMALLPOX

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	Oct. 3, 1931
Algeria:																		
Algiers	C	2	1	8			1											
Constantine	C		1		1									1				
Belgian Congo	C		47	42														
Bolivia.[1]																		
Brazil: Porto Alegre (alastrim)	C	53	19	5	9	10	9	13	11	6	17		7	13				
	D					1			1				2					
British East Africa: Tanganyika	C		13	7	37	83		29	1	18								
	D				7	5		5										
British South Africa:																		
Northern Rhodesia	C					21												
Southern Rhodesia	C			1		2												
Canada:																		
Alberta	C						1			1								
British Columbia	C							2	2			3		1	1			
Manitoba	C			4												1		
Winnipeg	C														1			
Nova Scotia	C	1																
Ontario	C	9	17	32	14	3	6	12	1		2	2	4		2			
Kingston	C	5												1				
Ottawa	C			1											1		5	2
Sault Ste. Marie	C	4	1															
Toronto	C	4	1	1														
Quebec	C				1													
Saskatchewan	C	46	48	54		13	10	19		10	6	10	8	8	12	5		
Regina	C	2	2															
Chile:																		
Antofogasta	C				1													
Chanaral	C		1															
China:																		
Amoy	C	2	6	4	1	1			1						1			
	D	1	3	3	1	1			1						1			
Canton	C	4	3	1	1			1					1					
Foochow	C	P	P	P				P		P		P						
Hankow	C	3	5	4	1		2		1		1	1						
Hong Kong	C	3	1															
	D	1	2															

[1] An epidemic of smallpox was reported on May 18 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	July 11	July 18	July 25	August, 1931: 1	Aug. 8	Aug. 15	Aug. 22	Aug. 29	September, 1931: 5	Sept. 12	Sept. 19	Sept. 26	Oct. 3, 1931
China—Continued																		
Manchuria—																		
Harbin (see also table below)	C		3															
Kwantung—Dairen	C	2	2	1														
Nanking	C	P	P															
Shanghai—																		
Foreigners only	C	17	7	11	2	1												
Including natives	D	18	7	13	2	1	2	1				1	1			1		
Swatow	D	2																
Tientsin	C		2			2	1											
Chosen (see table below).																		
Colombia:																		
Cali	D		1															
Santa Marta	D														1			
Dutch East Indies:																		
Batavia and West Java	C		2															
East Java and Madura	C		1															
Eritrea	C		3					2					10					
	D												2					
Finland	C	1																
France (see table below).																		
Great Britain:																		
England and Wales	C	744	570	287	56	45	50	36	26	25	19	21	33		19	45	45	
Bradford	C	6	8	5														
Leeds	C	2	2															
London	C	227	183	122	21	9	12	12	6	12	4	4	3	9	5	15	5	
London and Great Towns	C	558	403	328	53	33	34	32	22	20	17	10	13	30	11	34	35	
	D	2		1	1													
Sheffield	C	7													1	1		

Greece (see table below).																		
Honduras:																		
Tegucigalpa	C	1																
Tela	C	1																
India	C	14,265	11,403	7,313	1,492	1,376	1,236	1,255	978	904	645	400						
	D	2,923	1,849	1,704	404	363	292	293	234	213	179	120						
Bassein	C		1															
Bombay	C	8	9	6		1	3	2	1		1			1	2			
	D	5	4	5		1	3	2	1					1				
Calcutta	C	287	89	47	11	6	2	2	4	4		5	2	1	2		1	
	D	224	75	41	9	4	3	2		4		5	2	1	2		1	
Cochin	C	39	3							1	1	1					1	
Karachi	C	6		2					1									
	D			1														
Madras	C	19	8	2		2			1					1				1
	D	5	6	1														
Negapatam	C	3		3			1			2			3		1			
Rangoon	C	11	13	6	2		1		2		1	1	1		1			
	D	1	5	2	1				1			1			1			
Vizagapatam	C	10	6	6	2		2	1		3		2	3	1	1	1	2	
	D	2	1	2	1					3		1	3	1	1	1		
India (French):																		
Chandernagor	C	10	7	1	2		1											
	D	7	5		2													
Karikal	C	4	4	6	1	1	1	1	1	1	3	2		2				
	D	3	4	6	1	1	1	1	1	1	2	2		2				
Pondicherry Province	C	6	11	7	4	1		23	11			3	1	6	1			
	D	9	11	7	4	1		23	11			3	1	6	1			
India (Portuguese)	C	21	3															
	D	6	1															
Indo-China (see also table below):																		
Pnompenh	C		1	2														
	D		1															
Saigon and Cholon	C	1	2		1			2	1	1			1		3	2	1	
	D	1	1		1				1				1		2		1	
Iraq:																		
Baghdad	C	2	3	1											1			
	D		2															
Basra	C		2	1														
Mosul Liwa	C						1					1					5	
Ivory Coast (see table below).																		
Japan: Nagoya	C						1											
Mexico (see also table below):																		
Jalisco (State)—Guadalajara	D	1	2	1	1	1		1			2						1	
Mexico City and surrounding territory	C	43	45	25	12	5	4	1	8	2			2	2	1			
	D	14	11	13	4	3	1		1	1					1	1		
Monterrey	C			1														
Torreon	C	1	1	3										1	1			
	D	2		2											1			
Vera Cruz	C	2	1															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931 4	11	18	25	August, 1931 1	8	15	22	29	September, 1931 5	12	19	26	Oct. 3, 1931
Morocco (see table below).																		
Poland	C		3	3		17		1								1		
Portugal: Lisbon	C	56	67	48	15	12	18		17	12	8		10	21	18	17		
Rumania (see table below).																		
Siam	C	1	6	5		1												
	D		1	1			1											
Spain	C						7											
Straits Settlements	C	10	2							1								
	D	5	2															
Sudan (Anglo-Egyptian)	C	3	6	1											32			
	D		2												6			
Sudan (French) (see table below).																		
Syria (see table below).																		
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P															
Natal	C											P			P			
Orange Free State	C	P	P	P	P	P	P				P	P	P					
Transvaal	C			P	P	P	P											
Upper Volta	C	3	88	12	1		1											
	D		1															
On vessel:																		
S. S. Clan McTavish at Manila from Chittagong	C	1																
S. S. Taif (pilgrim ship) at Saukin from Jeddah	C	1										1						
S. S. Talodi at Suakin	C		1															

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			August, 1931		
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31
Indo-China (see also table above)	C	168	264	142		17	41	30	16	1	1		7	29		
	D	35	82								1		4	11		
Ivory Coast	C															7
Sudan (French)	C		4													
Syria: Beirut	C								1							

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
China: Harbin (see also table above)	C			7		13	10	
Chosen	C	1		11		1	4	2
	D	1		3				1
France	C	4	16	15	6	54	9	20
Greece	C		4			3	1	
Mexico (see also table above)	D		3		1	1	2	
Morocco	C		4	6	7	49	48	23
Rumania	C			1		1		

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Turkey	C	63	37	1		9	1	
	D	7	6					
Union of Socialist Soviet Republics	C				1,516	1,345		
Territories in Asia	C	194	532					
Ukraine	C	44	23					
Other territories in Europe	C	896	1,577					
Railroads, etc	C	43	77					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases: D, deaths; P, present]

Place		Mar. 8-Apr. 4, 1931	Apr. 5-May 2, 1931	May 3-30, 1931	May 31-June 27, 1931	Week ended—July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26
Algeria:																		
Algiers	C	3	3	7	9			2										
Bone	C											1	1					
Constantine Department	C	3	9	22	26	2		1		3							2	
Oran	C		1	2	2						1					1		
Australia, Western	C	1	1	1														
Bulgaria	C	9	30	16	30									1				
	D	2	3	4	6													
China:																		
Canton	C	1																
Manchuria—Harbin	C	3	8		16													
Shanghai	C							1	2			1						
Tientsin	C		2															
Chosen (see table below).																		
Colombia: Cali	D														1			
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C		1		3												1	
Beheira Province	C		4															
	D		2															
Cairo	C													1				
Eritrea: Asmara	C	1																
Great Britain: Scotland—																		
Fife County	C			1														
Kircudbright County	C																	1
Greece (see table below).																		
Guatemala (see table below).																		
Iraq: Baghdad	C	2		2														
	D			2														
Irish Free State:																		
Cork County—																		
Schull	C						1											
Skibbereen	C				2	1												

Kerry County—																		
Dingle	C			1														
Listowel	C				1													
Kildare County—Naas	C																	1
Limerick County—																		
Glin	C															2		
Limerick	C					2				1								
Michelstown	C					1												
Mayo County—																		
Belmullet	C			1														
Castlebar	C												1					
Westport	C												1					
Japan	C				1													
Latvia (see table below).																		
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D								1									
Mexico City, including municipalities in Federal District	C	216	170	75	46	28	9	7	9	7	6		5	5	1	2	2	
	D	84	66	33	19	4	3	2	3	5	3		2	1	1		2	
San Luis Potosi	C	5	3	2			1	3					1					
Torreon	C								1									
	D								1									
Morocco	C	7	13	42	101	37	20	24	21		2	1	5					
	D		1	4	6	4	4											
Palestine	C	5	5	4	5	2				3	3	1	4				4	
Panama Canal Zone—Balboa	C			2														
Paraguay: Asuncion	D	1																
Poland	C	287	538	298	97	9	17	13	14	10	4	10	7	6	2		2	2
	D	15	28	18	4	2	1	1	1	1		1						
Rumania	C	214	70	169	80	2	2	7		7	9	4	3		4			
	D	16	8	18	13	2	2	1			1		1					
Syria	C			4														
Tunisia:																		
Sbeitla, vicinity of	C	20	12															
	D	7																
Sfax	C	2																
Tunis	C	14	13	20	73	1			1					1				
	D			3	4													
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below).																		
Union of South Africa:																		
Cape Province	C	1	P	P	P	P	P	P	P		P	P	P	P				
Municipality of East London	C	P			1					1								
Natal	C	1	P	P	P			P	P		P							
Orange Free State	C	P	P	P	P	P	P	12	P									
Transvaal	C	P	P	P	P	P	P	P	P		P	P	P					
Yugoslavia (see table below).																		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases: D, deaths; P, present]

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931	August, 1931
Chosen: Seoul	C	124	3	4		6	1	
	D	8		1		1	1	
Czechoslovakia	C	20		5	11	2		
Greece	C	17	8	22	6	9	2	13
	D	2	1	3				2
Guatemala	C					33	34	3
	D					15	5	
Latvia	C	12						
Lithuania	C	3	99	34	10	13	8	2
	D	1	3	5		2		

Place		Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931	August, 1931
Mexico (see also table above)	D	83						
Turkey	C	18	15	32	13	11	9	
Union of Socialist Soviet Republics	C			1,513	1,324			
Territories in Asia	C	260						
Ukraine	C	419						
Other territories in Europe	C	1,373						
Railroads, etc	C	158						
Yugoslavia	C	12	10	43	14	2	3	1
	D		1	5				

YELLOW FEVER

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931: 4	11	18	25	August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26
Brazil:																	
Alagoas State	C										1						
	D										1						
Ceara State	C	2	1	1								1					
	D	2	1								1						
Minas Geraes State	C	5	2														
	D	2	1														
Rio de Janeiro State	C		2														
Sergipe State	C			1													
British Cameroons: Mamfe	C		3	2													
	D		2														
Colombia—Magdalena Province—Near Cienaga	C						4										

Gold Coast:																	
Akuse	C				2												
	D				1												
Dagomba District	C								2								
Kintampo	C						1										
	D						1										
Oda	C															1	
	D															1	
Tamale	C					2											2
	D					2											2
Wale Wale	C								1								
	D								1								
Ivory Coast:																	
Bobo Dioulasso	C					1											
	D					1											
Grand Bassam	C								4							1	
	D								2							1	
Kong Circle	C						4										
Seguela	C											P					
Nigeria. Abakaliki	C										1						
	D										1						
Senegal:																	
Podor (Hinterland)	C											1					
	D											1					
Saint Louis	C																1
Thies	C																1
	D																1
Sudan (French)	C						4	P									
Togo: Seva	C															1	
Upper Volta:																	
Banfora	C							2									2
	D							1									1
Diarabakoko	C																2
	D																1
Ouagadougou	C											1					1

UNITED STATES TREASURY DEPARTMEN

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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THE PELLAGRA-PREVENTIVE VALUE OF CANNED SPINACH, CANNED TURNIP GREENS, MATURE ONIONS, AND CANNED GREEN BEANS

By G. A. WHEELER, *Surgeon, United States Public Health Service*

The studies in nutrition at the Milledgeville State Hospital (formerly the Georgia State Sanitarium), Milledgeville, Ga., have for some time centered largely on the determination, by feeding tests in the human being, of the relative pellagra-preventive potency of the individual staple foods and foodstuffs. The results of the studies of fresh beef (1), milk (2), butter (1), soy bean (3), expressed juice of canned tomatoes (4), carrots (4), rutabaga turnip (4), cowpea (5), canned salmon (6), commercial wheat germ (5), and dried yeast (1) (3), have already been reported. Of these, fresh beef, milk, canned salmon, wheat germ, tomato juice, and dried yeast have been found to furnish adequate protection against pellagra in the quantities used. The soybean and cowpea possess the preventive factor, but to a much less degree; while butter, the rutabaga turnip, and carrot are practically negligible in this respect. These substances have also been tested in the dog with essentially parallel results.

Similar studies, on the human being, of canned spinach, canned turnip greens, mature onions, and canned green beans are presented here.

Practicability has governed the selection of these foodstuffs. The most pressing need among many people of the pellagrous sections (rural cotton belt) is some simple but effective article or articles of food which may be produced at home and made available during the spring and early summer months when their diet is normally most restricted and pellagra most prevalent. This will also serve to safeguard the diet of this element of the population during periods of economic distress brought about by a sudden slump in the price of cotton or depression in the smaller rural industrial (textile manufacturing) communities. Cheapness, ease, and abundance of production, and early availability and general desirability for food purposes are also essential considerations.

The winter and early maturing spring vegetables most nearly meet these requirements, but a study of them in the fresh state is restricted, because of their seasonal nature which, as a rule, is too short to permit of a satisfactory test. However, the more recently demon-

strated high degree of resistance of the antipellagric vitamin to moist heat has paved the way for their study in the canned state. While the canned product may possibly be somewhat inferior to the fresh, as regards the abundance of the antipellagric vitamin, the results are rendered all the more conclusive where positive effects are secured. It may therefore be safely assumed that the fresh product is at least fully as efficacious as the canned.

As in similar previous studies, the value of these substances as pellagra preventives has been determined by their use as supplements to a basic diet which is believed to be adequate in all known respects, except for a deficiency of the antipellagric vitamin. On this basic diet alone, even when the energy values are increased to compensate fully for those of the supplements employed, all of any given number of persons may be expected to develop pellagra within about three to six months regardless of whether they have suffered previous attacks (7). Any notable prolongation of this period must, therefore, be attributed to the pellagra-preventive qualities of the substance with which it is supplemented. Maintenance of body weight throughout the period of the tests, or prior to the development of pellagra, indicates that the energy value of these experimental diets is adequate for the type of subject used—inactive females weighing around 50 to 55 kilograms.

Each experiment is allowed to run for a period of one year unless sooner terminated by the development of a significant number of cases of pellagra.

SPINACH

In the test of this substance a commercial brand of canned California spinach was used, and a daily allowance of 482 grams, including the can liquor, was permitted. The approximate composition of the spinach-supplemented diet is given in Table 1.

TABLE 1.—*Basic diet plus canned spinach*

Article of diet	Quantity	Nutrients			Calories
		Protein	Fat	Carbohydrate	
Basic	*Grams*	*Grams*	*Grams*	*Grams*	
Corn meal	269.3	21.8	5.1	203.1	962
Cowpeas (California blackeye)	42.5	9.1	.6	25.8	146
Wheat flour	21.3	2.8	.3	15.5	76
Lard	42.5		42.5		380
Cod-liver oil	14.0		14.0		127
Tomato juice	127.6	.9			4
Calcium carbonate (U. S. P.)	3.0				
	Drops				
Dilute hydrochloric acid (U. S. P.)	90				
Sirup iodid of iron (U. S. P.)	2				
Supplemental	*Grams*				
Canned spinach	482.0	11.6	1.9	28.0	185
Total nutrients and calories		49.2	64.4	272.4	1,886

The diet of Table 1 was given to a group of 16 colored female inmates of the State hospital, 14 of whom remained under observation for a period of one year. Of this number, one developed symptoms of pellagra near the end of the eleventh month.

Since the entire group would have developed pellagra within from three to six months (7) had not the spinach supplement been used, it seems safe to conclude that the protection of all for a period of more than 10 months, and all but one for a period of 12 months, was due to the quantity of the preventive factor contained in the spinach. It may therefore be stated that canned spinach supplies the pellagra-preventive vitamin; but since a rather liberal allowance failed to give complete protection, it can not be classed as a particularly rich source of this factor. However, in view of its availability in the early spring and its otherwise desirable nutrient properties, this food stuff might well be included in any program designed to bring about permanent control of pellagra. While it and other important articles of diet must be rated as inferior to fresh beef, salmon, yeast, etc., they possess a high contributory value, and in instances (which are doubtless many) where pellagra develops on a diet less restricted than the experimental basic diet used in these tests, may, as single supplements, prove quite adequate.

TURNIP GREENS

In this experiment a commercial brand of canned turnip greens was used. The quantity allowed (482 grams, including the can liquor) was the same as in the spinach test. The basic diet was the same for both. The approximate composition of the turnip greens-supplemented diet is given in Table 2.

TABLE 2.—*Basic diet plus canned turnip greens*

Article of diet	Quantity	Nutrients			Calories
		Protein	Fat	Carbohydrate	
Basic	*Grams*	*Grams*	*Grams*	*Grams*	
Corn meal	260.3	24.8	5.1	203.1	962
Cowpeas (California blackeye)	42.5	9.1	.6	25.8	146
Wheat flour	21.3	2.8	.3	15.5	76
Lard	42.5		42.5		386
Cod-liver oil	14.0		14.0		127
Tomato juice	127.6	.9			4
Calcium carbonate (U. S. P.)	3.0				
	Drops				
Dilute hydrochloric acid (U. S. P.)	90				
Sirup iodid of iron (U. S. P.)	2				
Supplemental	*Grams*				
Canned turnip greens	482.0	10.1	1.4	37.1	211
Total nutrients and calories		47.7	63.9	281.5	1,912

In this experiment 16 colored female inmates were used, 15 of whom continued under observation on the turnip greens-supplemented diet for a period of one year. No evidence of pellagra was observed. Therefore, in view of the previously determined fact that without the turnip greens practically all would have developed pellagra within about six months, it may be safely assumed that canned turnip greens contain the pellagra-preventive vitamin and, in the quantity used, at least, may be regarded as a suitable supplement for an otherwise pellagra-producing diet.

This result has much potential value in the practical control of pellagra. The growing of turnip greens is well adapted to all portions of the South. They can be produced easily and cheaply and, under ordinary seasonal conditions, may be made available in the fresh state at the very season when protective supplements are normally scarcest. The use of turnip greens as an article of diet is already well established throughout the South, and with a little well-directed effort on the part of local health agencies and others their production and consumption may be increased almost indefinitely.

MATURE ONIONS

In the test of onions, a medium-sized commercial variety of red onions was used. The dry outside skin was removed and the remainder chopped and steamed until done. Table salt sufficient to season was added. Each patient was allowed 525 grams per day. The basic diet was the same as in the spinach and turnip-greens tests with the exception that 28 grams of bakers' bread was included to compensate for the rather low nutritive value of the onions. The approximate composition of the onion-supplemented diet is given in Table 3.

TABLE 3.—*Basic diet plus mature onions*

Article of diet	Quantity	Nutrients			Calories
		Protein	Fat	Carbo-hydrate	
Basic	*Grams*	*Grams*	*Grams*	*Grams*	
Corn meal	269.3	24.8	5.1	203.1	962
Cowpeas (California blackeye)	42.5	9.1	.6	25.8	146
Wheat flour	21.3	2.8	.3	15.5	76
Bakers' bread	28.0	2.7	.3	14.9	73
Lard	42.5		42.5		386
Cod-liver oil	14.0		14.0		127
Tomato juice	127.6	.9			4
Calcium carbonate (U. S. P.)	3.0				
	Drops				
Dilute hydrochloric acid (U. S. P.)	90				
Sirup iodid of iron (U. S. P.)	2				
Supplemental	*Grams*				
Mature onions	525.0	8.4	1.6	52.0	255
Total nutrients and calories		48.7	64.4	311.3	2,029

In the test of onions 10 white female inmates were used. Five of these developed pellagra within three months. Following the appearance of the fifth case, the test was discontinued.

Inasmuch as the time required for the development of pellagra on the onion-supplemented diet did not appear to be appreciably longer than on the basic diet alone, it seems permissible to conclude that the mature onion is a very poor source of the pellagra-preventive vitamin.

GREEN BEANS

In this test a commercial brand of canned green stringless beans was used. The daily allowance, including the can liquor, was 550 grams. The basic diet was the same as that used in the preceding test. The approximate composition of the green beans-supplemented diet is given in Table 4.

TABLE 4.—*Basic diet plus canned green beans*

Article of diet	Quantity	Nutrients			Calories
		Protein	Fat	Carbohydrate	
Basic	*Grams*	*Grams*	*Grams*	*Grams*	
Corn meal	269.3	24.8	5.1	203.1	962
Cowpeas (California blackeye)	42.5	9.1	.6	25.8	146
Wheat flour	21.3	2.8	.3	15.5	76
Bakers' bread	28.0	2.7	.3	14.9	73
Lard	42.5		42.5		386
Cod-liver oil	14.0		14.0		127
Tomato juice	127.6	.9			4
Calcium carbonate (U. S. P.)	3.0				
	Drops				
Dilute hydrochloric acid (U. S. P.)	90				
Sirup iodid of iron	2				
Supplemental	*Grams*				
Canned green beans	550.0	7.7	.3	36.3	188
Total nutrients and calories		48.0	63.1	295.6	1,962

In the test of canned green beans, 14 white female inmates were used, 12 of whom continued under observation for a significant period. Of these, 2 developed pellagra during the seventh month, 1 during the eighth month, and 4 during the ninth month. The test was terminated at the end of the ninth month.

Though the time required for the development of pellagra was appreciably prolonged by the addition of canned green beans to the basic diet, the degree of protection was strikingly inadequate. Canned green beans may therefore be regarded as a relatively poor source of the pellagra-preventive vitamin and, in the quantity used, which is rather generous, should not be depended upon adequately to supplement an otherwise pellagra-producing diet.

SUMMARY AND CONCLUSIONS

1. Canned spinach, canned turnip greens, mature onions, and canned green beans have been tested for their relative pellagra-preventive potency.

2. Canned spinach supplies the pellagra-preventive vitamin, but can not be regarded as especially rich in it. It is, however, considered an important contributory source of this factor.

3. Canned turnip greens supply the pellagra-preventive vitamin and, at least in liberal quantity, adequately supplement an otherwise pellagra-producing diet. This substance meets many of the requirements of a practical and effective dietary supplement in the pellagrous sections.

4. The mature onion is a very poor source of the pellagra-preventive vitamin.

5. Canned green beans are, relatively, a poor source of the pellagra-preventive vitamin.

REFERENCES

(1) Goldberger, Wheeler, Lillie, and Rogers: A further study of butter, fresh beef and yeast as pellagra preventives, etc. Pub. Health Rep., vol. 41, pp. 297–318, Feb. 19, 1926. (Reprint No. 1062.)

(2) Goldberger and Tanner: A study of the treatment and prevention of pellagra, etc. Pub. Health Rep., vol. 39, pp. 87–107, Jan. 18, 1924. (Reprint No. 895.)

(3) Goldberger and Tanner: A study of the pellagra-preventive action of dried beans, casein, dried milk, brewers yeast, etc. Pub. Health Rep., vol. 40, pp. 54–80, Jan. 9, 1925. (Reprint No. 984.)

(4) Goldberger and Wheeler: A study of the pellagra-preventive action of the tomato, carrot, and rutabaga turnip. Pub. Health Rep., vol. 42, pp. 1299–1306, May 13, 1927. (Reprint No. 1157.)

(5) Goldberger and Wheeler: A study of the pellagra-preventive action of the cowpea (*Vigna sinensis*) and of commercial wheat germ. Pub. Health Rep., vol. 42, pp. 2383–2391, Sept. 30, 1927. (Reprint No. 1181.)

(6) Goldberger and Wheeler: A study of the pellagra-preventive action of canned salmon. Pub. Health Rep., vol. 44, pp. 2769–2771, Nov. 15, 1929. (Reprint No. 1332.)

(7) Walker, N. P., and Wheeler, G. A.: Influence on epilepsy of a diet low in the pellagra-preventive factor. Pub. Health Rep., vol. 46, pp. 851–860, April 10, 1931. (Reprint 1468.)

A TECHNIQUE FOR ADJUSTMENT OF THE pH OF TISSUE CULTURES PLANTED IN CARREL FLASKS

By W. R. Earle, *Cytologist, Division of Pharmacology, National Institute of Health, United States Public Health Service*

In a previous publication (1) the author described a method which had been found useful for adjusting and controlling the pH of tissue cultures planted in hanging drops on the usual type of hollow-ground slides. In the course of further work it was found necessary to adapt this technique to cultures planted in Carrel flasks. The adaptation worked out has been found to be very simple and quite satisfactory, and is here outlined for the benefit of those desiring to

use a controlled pressure of CO_2 as a means of adjusting the pH of such flask cultures.

Carrel D 3.5 cm. flasks were used. The cultures were planted in the usual manner, with either a solid medium or a solid medium bathed by a liquid medium. Upon completion of planting, each flask was stoppered with a size 00 one-hole rubber stopper, through the hole of which passed a glass-tube insert of the approximate shape and size shown in Figure 1. This glass-tube insert was made from capillary tubing of 3 mm. external diameter and 1 mm. bore. The tip of the insert was drawn down to about 1.5 mm. in diameter, and had a bore of about 0.5 mm.

Once stoppered, the flasks were set aside. When the complete series of flasks had been planted, the exposed part of the rubber stopper in each flask and the terminal part of the neck of each flask were brushed over with a hot solution of 4 per cent pure white crêpe rubber dissolved in paraffin. The flasks were then placed in racks.

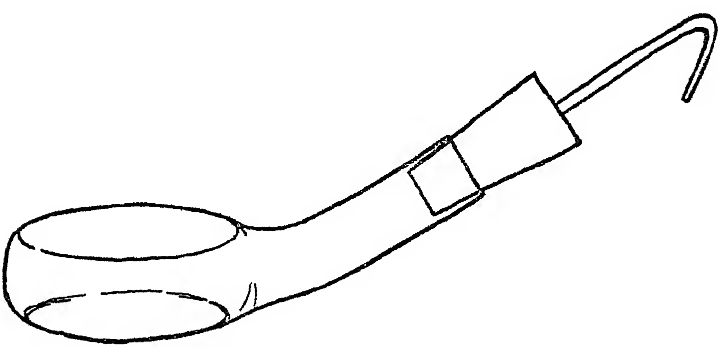

FIGURE 1.—Carrel D 3.5 cm. flask, with rubber stopper and glass insert, as described in the text

Each rack was of such a type as to hold four flasks in a vertical position. The racks were then transferred to the jar of the equilibration apparatus previously described [1] (1), where they were equilibrated in the same manner as was described for hanging-drop cultures on

[1] During the warm weather of the past summer some trouble has been experienced, due to the growth of bacteria in the jars of the "saturation trains" of this equilibration apparatus. This has been remedied by making the following changes in the apparatus:

The funnels and the cloth wadding were removed from all jars, and the funnel in each jar was replaced by a piece of plain glass tubing reaching to within about 1 cm. of the bottom of the jar. The jars were then filled with lump pumice, the lumps of which were approximately 8 mm. in diameter, and this pumice was saturated with 1/5,000 solution of mercurochrome dissolved in distilled water. This was run into the jars until a layer of solution 1 cm. deep collected in the bottom of each jar. This water solution served to saturate the gas with water vapor, while the mercurochrome served to retard bacterial growth. Mercurochrome was chosen because it is nonvolatile at room temperatures and because it is so highly colored that if any trace should leak over into the gas manifold its presence would be shown at once. Any nonvolatile antiseptic, such as mercuric chloride, probably might be used with equal satisfaction, particularly if used in conjunction with some nonvolatile dye to indicate if leakage occurred into the manifold.

In order to eliminate any chance that any of the mercurochrome solution might be sucked over into the manifold, an empty jar, similar to the jars used in the "saturation trains," and fitted with inlet and outlet tubes similar to those carried by the other jars, was inserted between the last jar of each "saturation train" and the manifold. This served as a trap to catch any of the mercurochrome solution which might conceivably leak over.

slides. Following equilibration, the tip of the glass insert in each flask was sealed by dipping the tip in a small crucible of very hot red sealing wax. The flasks were then incubated and examined as usual.

In instances where it was later desired to change the culture media in the flasks, the wax on the neck of the flask was melted by flaming, the flask was opened, the stopper, with its glass insert, was discarded, and the neck of the flask was covered by a small glass cap. After changing the fluids, the flask was resealed with a fresh stopper and insert and was then reequilibrated as described.

It was found that these flask cultures could be equilibrated and sealed even more easily and rapidly and with less chance of leakage than could the hanging-drop cultures on slides. Further, it was found that when the flasks were incubated for a number of days without opening, the pH drift was markedly less than for the cultures planted in hanging drops on slides. These seals were also much less fragile than were those on the hanging-drop preparations.

The change in the pH of the culture medium of any flask during the time required to seal a series of flasks was found to be very slight indeed. For example, a series of 25 flasks was made up, each containing 2 c. c. of Tyrode solution and 0.02 c. c. of phenol red solution. The preparations were then equilibrated and sealed as described above, the pCO_2 being approximately 60 mm. At the end of one hour the variation in pH between any two flasks in the series was found to be approximately 0.1 pH unit, the pH for the series being approximately 7.1. This pH was not perceptibly changed at the end of four days.

A word may be said as to the method of cleaning the apparatus used. The flasks were cleaned as usual and rinsed well with distilled water. Where new rubber stoppers were used, these were cleaned by boiling first in dilute sodium hydroxide solution, then in dilute hydrochloric acid solution, and finally, after washing with running tap water, in several changes of distilled water.

Where old stoppers, previously used on such cultures, were employed, after the glass inserts had been removed from them the stoppers were boiled out in a large volume of distilled water, then rinsed in several changes of distilled water. The glass-tube inserts, removed from the stoppers, were cleaned by gently heating the sealed end of the insert in a flame until the sealing wax was melted, and then blowing it out. The remainder of the wax was then dissolved off by soaking the insert for 24 hours in two changes of alcohol, after which the inserts were washed in the usual manner with water.

LITERATURE CITED

(1) Earle, W. R.: A technique for adjustment of pH of hanging drop tissue cultures. Pub. Health Rep. (1931), 46: 1998–2008.

EUROPEAN CONFERENCE ON RURAL HYGIENE, HELD AT GENEVA, SWITZERLAND, JUNE 29–JULY 7, 1931

The following account of the European Conference on Rural Hygiene, held at Geneva, Switzerland, June 29–July 7, 1931, is taken from a report by Surgeon J. G. Townsend, who was in attendance:

Upon the initiative of the Spanish Government, the health committee of the League of Nations approved a conference of representatives of European States for the purpose of a study of the common problems of rural hygiene. The International Institute of Agriculture at Rome was invited to cooperate in the project, and non-European governments were invited to send "observers" to hear the discussions and follow the work of the conference.

The health committee recommended the following agenda as a basis of study:

Item 1: Guiding principles and suitable methods for insuring effective medical assistance in rural districts.

Item 2: The most effective methods of organizing the health services in rural districts.

Item 3: The sanitation of rural districts; the most effective and economical methods.

The conference convened at Genèva June 29, 1931, with delegates present from 25 European countries and observers from 7 non-European countries. Introductory addresses were made by Mr. J. Avenal, acting secretary general of the League of Nations, and Prof. G. Pittaluga, president of the conference, director of the National School of Hygiene, Madrid.

The first few days were taken up in plenary sessions with the reading and discussion of the reports of the committees of experts on the first and second items of the agenda. The report on the third item was not read, as it was thought, since questions of sanitation in rural districts were so technical, it would be better to refer this item to a special commission of the conference.

Following the plenary sessions, the conference divided into three groups, or commissions, each commission discussing more in detail the reports of the three committees of experts on the three items of the agenda, and reporting back to the plenary session the recommendations relative to the adoption of the several reports. Each delegate and observer was privileged to elect which commission he chose to attend.

On the proposal of the president, the conference while in plenary session adopted the following resolution:

The conference decides to set up a fourth commission which, after examining the various proposals made by the delegations and in the report of the preparatory committee, will submit to the conference for approval the questions to be studied under the auspices of the League of Nations.

The conference also asks whether the League of Nations' health organization would convene a meeting of the directors of European schools of hygiene during the conference to consider to what extent these schools might undertake certain studies among those to be recommended by the conference and to make suggestions to the fourth committee on this subject.

At the close of these deliberations, which lasted several days, each commission, through its respective president, reported back to the plenary session its recommendations on the several items of the agenda as prepared by the committee of experts.

The last two days of the conference were plenary sessions, at which the reports of the four commissions were read and adopted.

Among the resolutions recommended for adoption by the Resolutions (Fourth) Commission, was the following:

The conference desires to emphasize the importance for rural hygiene of close collaboration between administrators of public health and assistants, agricultural experts, engineers, architects, medical officers and practitioners, representatives of health insurance institutions, agricultural associations, and private health agencies.

The conference adjourned July 7, 1931.

This was the first conference of its kind ever held, and much useful information was gained as to rural health problems abroad and the methods taken in different countries to meet situations as they arise, as well as routine procedures in the promotion of public health.

DEATHS DURING WEEK ENDED OCTOBER 17, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended October 17, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Oct. 17, 1931	Corresponding week, 1930
Policies in force	74, 607, 364	75, 391, 169
Number of death claims	11, 041	12, 205
Death claims per 1,000 policies in force, annual rate	7. 7	8. 4
Death claims per 1,000 policies, first 42 weeks of year, annual rate	9. 7	9. 6

Deaths [1] *from all causes in certain large cities of the United States during the week ended October 17, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended Oct. 17, 1931				Corresponding week, 1930		Death rate [2] for the first 42 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	6, 864	10. 0	625	[4] 49	10. 9	729	12. 0	11. 9
Akron	23	4. 6	3	30	7. 5	5	7. 8	7. 9
Albany [5]	38	15. 3	4	79	9. 4	3	13. 8	14. 8
Atlanta	52	9. 8	9	92	12. 7	10	15. 0	15. 7
White	28		6	95		4		
Colored	24	(6)	3	86	(6)	6	(6)	(6)
Baltimore [5]	170	10. 9	22	75	12. 2	15	14. 4	13. 9
White	130		17	74		12		
Colored	40	(6)	5	78	(6)	3	(6)	(6)
Birmingham	40	7. 7	2	20	13. 0	14	13. 4	13. 7
White	16		2	34		0		
Colored	24	(6)	0	0	(6)	14	(6)	(6)
Boston	209	13. 9	27	77	14. 1	18	14. 3	14. 1
Bridgeport	28	9. 9	4	66	11. 0	4	11. 1	11. 1
Buffalo	121	10. 9	10	41	11. 7	12	13. 0	13. 0
Cambridge	27	12. 3	1	20	14. 7	3	12. 1	11. 9

See footnotes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended October 17, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930*—Continued

City	Week ended Oct. 17, 1931				Corresponding week, 1930		Death rate [2] for the first 42 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Camden	23	10.1	4	70	11.9	6	14.2	13.4
Canton	17	8.3	4	91	10.9	3	10.1	10.0
Chicago [5]	566	8.5	45	40	8.9	53	10.7	10.4
Cincinnati	114	13.0	9	54	12.1	12	16.0	15.5
Cleveland	176	10.1	12	35	10.9	17	11.2	11.1
Columbus	62	10.9	7	68	11.6	8	13.5	15.6
Dallas	57	10.9	6		8.3	7	11.2	11.3
White	44	-	5	-	-	4	-	-
Colored	13	(6)	1	-	(6)	3	(6)	(6)
Dayton	49	12.4	2	28	13.7	7	11.9	10.7
Denver	81	14.5	3	29	11.7	5	13.9	14.8
Des Moines	36	13.0	3	53	13.5	6	11.2	11.8
Detroit	249	7.9	31	49	7.8	37	8.3	9.3
Duluth	20	10.2	2	49	10.8	0	11.3	11.3
El Paso	21	10.4	3	-	18.2	4	15.6	17.4
Erie	23	10.2	1	19	6.3	1	10.5	11.2
Fall River [5] [7]	23	10.4	4	91	10.9	4	11.2	11.9
Flint	24	7.6	2	26	8.9	6	6.9	9.2
Fort Worth	29	9.0	3	-	8.6	0	10.8	10.9
White	23	-	3	-	-	0	-	-
Colored	6	(6)	0	-	(6)	0	(6)	(6)
Grand Rapids	24	10.3	0	0	8.6	4	9.1	10.3
Houston	47	7.9	8	-	8.3	6	11.1	12.1
White	34	-	3	-	-	2	-	-
Colored	13	(6)	5	-	(6)	4	(6)	(6)
Indianapolis	69	9.7	5	41	11.0	4	13.8	14.7
White	57	-	5	47	-	3	-	-
Colored	12	(6)	0	0	(6)	1	(6)	(6)
Jersey City	32	5.2	2	18	12.0	11	11.4	11.3
Kansas City, Kans	21	8.9	2	41	13.2	3	12.6	11.8
White	17	-	1	25	-	2	-	-
Colored	4	(6)	1	127	(6)	1	(6)	(6)
Kansas City, Mo	103	13.1	10	76	12.6	14	13.1	13.3
Knoxville	22	10.5	4	85	13.6	4	12.4	13.7
White	20	-	3	71	-	3	-	-
Colored	2	(6)	1	204	(6)	1	(6)	(6)
Long Beach	31	10.6	1	24	11.2	2	9.8	9.9
Los Angeles	247	9.8	11	32	10.6	15	10.7	11.0
Louisville	72	12.2	12	103	14.6	5	14.3	13.6
White	53	-	10	98	-	4	-	-
Colored	19	(6)	2	133	(6)	1	(6)	(6)
Lowell [7]	33	17.1	2	51	15.5	5	12.8	13.4
Lynn	16	8.1	1	26	8.1	1	9.5	10.4
Memphis	69	13.9	12	127	17.0	11	16.6	17.1
White	43	-	9	150	-	6	-	-
Colored	26	(6)	3	87	(6)	5	(6)	(6)
Miami	21	9.7	0	0	8.9	3	11.8	11.0
White	19	-	0	0	-	1	-	-
Colored	2	(6)	0	0	(6)	2	(6)	(6)
Milwaukee	73	6.5	12	52	9.3	12	9.3	9.6
Minneapolis	102	11.2	5	32	10.0	3	11.2	10.6
Nashville	37	12.4	3	45	20.6	15	16.9	16.7
White	21	-	3	60	-	10	-	-
Colored	16	(6)	0	0	(6)	5	(6)	(6)
New Bedford [7]	23	10.7	3	80	13.0	5	12.1	10.9
New Haven	37	11.9	3	57	8.7	2	12.4	12.7
New Orleans	140	15.6	10	55	17.8	18	16.9	17.4
White	74	-	4	33	-	8	-	-
Colored	66	(6)	6	98	(6)	10	(6)	(6)
New York	1,201	8.8	96	40	9.6	112	11.2	10.8
Bronx Borough	172	6.7	7	16	6.4	13	8.2	7.9
Brooklyn Borough	416	8.3	33	35	8.8	55	10.3	9.9
Manhattan Borough	435	12.5	42	72	14.7	38	16.9	16.0
Queens Borough	150	6.8	12	33	6.6	5	7.2	7.1
Richmond Borough	28	8.9	2	36	11.1	1	13.8	14.3
Newark, N. J	78	9.1	7	37	10.6	9	11.6	12.0
Oakland	62	11.1	2	26	8.9	7	10.5	10.9
Oklahoma City	43	11.4	4	55	11.1	7	10.9	10.8
Omaha	49	11.8	1	11	12.2	2	13.8	13.6
Paterson	28	10.5	3	52	6.8	1	13.3	12.2

See footnotes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended October 17, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930*—Continued

City	Week ended Oct. 17, 1931				Corresponding week, 1930		Death rate [2] for the first 42 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [4]	Deaths under 1 year	1931	1930
Peoria	23	11.1	6	158	10.9	2	12.6	12.3
Philadelphia	397	10.5	37	54	11.4	47	13.1	12.6
Pittsburgh	177	13.7	29	100	13.7	31	14.4	13.8
Portland, Oreg	62	10.5	6	73	12.2	8	11.6	12.1
Providence	63	12.9	11	101	11.7	7	12.8	13.0
Richmond	54	15.3	4	58	15.9	7	15.5	14.8
White	35		3	66		3		
Colored	19	(6)	1	43	(6)	4	(6)	(6)
Rochester	61	9.6	4	36	11.1	9	11.9	11.6
St. Louis	170	10.7	10	34	12.2	12	15.1	14.2
St. Paul	47	8.9	4	41	10.3	2	10.6	10.1
Salt Lake City [5]	26	9.5	4	60	13.0	3	12.1	12.2
San Antonio	47	10.2	3		9.2	6	14.4	10.4
San Diego	36	10.0	1	20	13.6	1	13.5	14.3
San Francisco	132	10.6	5	33	11.3	2	13.0	13.0
Schenectady	15	8.1	0	0	11.4	1	10.5	11.3
Seattle	72	10.1	4	38	10.0	0	11.3	10.8
Somerville	8	4.0	0	0	8.0	2	8.8	9.8
South Bend	16	7.7	5	125	7.0	3	12.4	8.8
Spokane	25	11.2	0	0	11.7	4	11.7	12.3
Springfield, Mass	31	10.6	3	46	11.8	1	11.6	12.2
Syracuse	50	12.2	6	71	12.2	4	12.2	11.6
Tacoma	29	14.0	4	103	13.2	0	11.9	12.3
Toledo	63	11.1	6	55	14.7	4	16.5	12.7
Trenton	36	15.2	5	87	16.9	5	14.0	16.7
Utica	26	13.2	2	52	14.3	0	15.7	14.8
Washington, D. C	114	12.1	11	61	13.7	15	8.1	15.1
White	60		5	41		4		
Colored	54	(6)	6	103	(6)	11	(6)	(6)
Waterbury	18	9.3	2	60	5.7	1	9.7	9.6
Wilmington, Del. [7]	25	12.2	1	22	12.2	2	14.0	14.4
Worcester	38	10.0	3	41	11.5	7	12.0	12.8
Yonkers	19	7.1	6	157	8.1	0	8.4	8.0
Youngstown	22	6.6	1	14	8.3	2	10.1	10.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1920 was as follows: Atlanta, 31; Baltimore, 15; Birmingham, 39; Dallas, 15; Fort Worth, 14; Houston, 25; Indianapolis, 11; Kansas City, Kans., 14; Knoxville, 15; Louisville, 17; Memphis, 38; Miami, 31; Nashville, 30, New Orleans, 26; Richmond, 32; and Washington, D. C., 25.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

[These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers]

Reports for Weeks Ended October 24, 1931, and October 25, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 24, 1931, and October 25, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930
New England States:								
Maine	5	1	2		129	3	0	1
New Hampshire	3	1			1		0	0
Vermont		1			41		0	0
Massachusetts	48	81	11	1	30	113	3	2
Rhode Island	5	8			81		0	0
Connecticut	4	7	4	1	8	13	1	0
Middle Atlantic States:								
New York	67	63	7[1]	4[1]	67	75	8	12
New Jersey	32	65	6	7	11	25	0	0
Pennsylvania	106	120			116	133	10	0
East North Central States:								
Ohio	102	57	1	10	12	13	2	1
Indiana	68	45	8		42	15	2	1
Illinois	99	143	10	16	24	25	5	6
Michigan	35	80		6	29	50	2	8
Wisconsin	14	16	14	18	5	77	3	0
West North Central States:								
Minnesota	14	11			8	7	1	1
Iowa	22	11			7		0	1
Missouri	116	40	3	1	7	69	2	8
North Dakota	6				1		1	0
South Dakota	4	7			39	2	0	0
Nebraska	19	7	2		1	1	0	1
Kansas	42	15		2	11	7	1	0
South Atlantic States:								
Delaware	3	1	1		1		0	0
Maryland [2]	86	41	5	8	12	2	1	0
District of Columbia	24	7		1		2	0	0
Virginia								
West Virginia	104	43	20	8	28	24	0	0
North Carolina	186	192	8	6	24	3	0	1
South Carolina [3]	58	53	264	391			0	0
Georgia [3]	53	24	17	59	8	3	0	0
Florida	32	17			68	2	0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 1 case in South Carolina; 3 cases in Georgia; and 4 cases in Alabama.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 24, 1931, and October 25, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930
East South Central States:								
Kentucky	171	24	-------	-------	-------	-------	0	2
Tennessee	177	64	11	17	6	12	6	2
Alabama [3]	107	89	5	25	3	15	0	3
Mississippi	165	61	-------	-------	-------	-------	0	1
West South Central States:								
Arkansas	66	9	1	6	5	-------	1	0
Louisiana	61	16	9	6	3	-------	1	2
Oklahoma [4]	76	91	10	15	-------	8	0	0
Texas	65	20	9	33	-------	4	3	0
Mountain States:								
Montana	-------	1	-------	-------	25	1	0	0
Idaho	-------	1	-------	-------	1	1	0	0
Wyoming	-------	-------	1	-------	-------	-------	2	0
Colorado	9	17	-------	-------	-------	51	0	0
New Mexico	24	5	-------	-------	-------	8	0	1
Arizona	4	13	-------	4	1	28	0	1
Utah [2]	1	-------	7	-------	-------	3	0	2
Pacific States:								
Washington	7	27	-------	-------	-------	3	1	2
Oregon	3	4	22	5	5	54	1	1
California	82	69	37	23	68	86	2	8

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930
New England States:								
Maine	11	11	10	17	0	0	8	14
New Hampshire	1	5	3	8	0	0	0	3
Vermont	3	0	7	10	0	0	0	0
Massachusetts	40	22	167	105	0	0	14	8
Rhode Island	2	1	11	11	0	0	3	5
Connecticut	39	3	30	16	0	0	7	7
Middle Atlantic States:								
New York	184	19	238	179	1	1	50	43
New Jersey	36	1	75	71	0	0	7	12
Pennsylvania	23	4	252	319	0	4	106	61
East North Central States:								
Ohio	2	49	278	230	1	14	29	41
Indiana	3	8	85	92	13	28	9	15
Illinois	32	28	201	207	2	28	45	39
Michigan	41	20	114	139	0	17	16	24
Wisconsin	37	8	51	59	0	6	5	2
West North Central States:								
Minnesota	37	13	46	36	0	6	2	4
Iowa	10	14	31	45	25	13	6	1
Missouri	2	13	69	33	8	20	31	22
North Dakota	2	1	8	13	2	7	12	2
South Dakota	0	8	17	4	2	7	2	1
Nebraska	1	14	15	26	2	2	3	0
Kansas	0	43	66	38	4	7	7	10
South Atlantic States:								
Delaware	0	0	7	3	0	0	2	9
Maryland [2]	4	4	78	48	0	0	35	47
District of Columbia	0	1	15	18	0	0	3	2
Virginia	1	-------	-------	-------	1	-------	-------	-------
West Virginia	6	1	45	77	0	1	73	40
North Carolina	1	0	131	133	0	0	20	13
South Carolina [3]	0	1	35	27	0	2	18	32
Georgia [3]	0	1	27	49	2	0	33	22
Florida	1	0	9	5	0	2	5	3

[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 1 case in South Carolina; 3 cases in Georgia; and 4 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 24, 1931, and October 25, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930	Week ended Oct. 24, 1931	Week ended Oct. 25, 1930
East South Central States:								
Kentucky	0	0	86	43	0	0	60	19
Tennessee	1	2	84	50	1	7	59	37
Alabama [3]	0	1	65	67	0	0	19	26
Mississippi	1	1	43	36	42	0	14	14
West South Central States:								
Arkansas	0	1	26	7	2	3	17	21
Louisiana	1	4	16	13	1	0	31	15
Oklahoma [4]	2	2	37	53	3	11	44	41
Texas	3	4	22	21	0	4	33	19
Mountain States.								
Montana	2	1	13	8	0	0	4	2
Idaho	2	3	6	1	2	0	4	2
Wyoming	0	1	6	7	1	0	0	2
Colorado	0	5	21	17	0	0	8	5
New Mexico	0	0	6	3	1	0	13	12
Arizona	1	2	5	9	0	5	1	3
Utah [2]	0	0	5	7	0	0	4	3
Pacific States								
Washington	9	4	67	65	9	29	6	14
Oregon	2	2	15	14	7	14	2	4
California	6	72	226	66	7	11	6	14

[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 1 case in South Carolina; 3 cases in Georgia and 4 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August, 1931										
Colorado		25			10		1	31	8	26
Hawaii Territory	6	20			38		1	1	0	2
New Hampshire		4					22	8		8
September, 1931										
Colorado		26		3	11		0	47	1	27
Idaho	3	14	1		13		6	32	9	30
Illinois	23	202	476	109	167	3	191	331	26	172
Louisiana	6	151	23	101	7	30	5	54	11	263
Minnesota	4	61	3		29		252	124	6	46
Missouri	10	211	9	42	18	31	13	86	26	136
New Hampshire		2					29	5		6
North Carolina	4	453	8		31	74	21	297	0	198
Pennsylvania	22	297		1	283	1	127	456	0	282
Rhode Island	2	16	1		36		62	51	0	13
Wisconsin	5	58	52		80		324	88	5	29

August, 1931

	Cases
Chicken pox:	
Colorado	29
Hawaii Territory	5
Conjunctivitis, follicular:	
Hawaii Territory	7
Dysentery:	
Hawaii Territory (bacillary)	2
German measles:	
Colorado	2
Hookworm disease:	
Hawaii Territory	28
Leprosy:	
Hawaii Territory	6
Mumps:	
Colorado	39
Hawaii Territory	6

	Cases
Plague:	
Hawaii Territory	1
Paratyphoid fever:	
Colorado	3
Tetanus:	
Hawaii Territory	4
Trachoma:	
Hawaii Territory	1
Undulant fever:	
Colorado	5
Vincent's angina:	
Colorado	12
Whooping cough:	
Colorado	79
Hawaii Territory	2

September, 1931

	Cases
Anthrax:	
Pennsylvania	1
Chicken pox:	
California	23
Idaho	21
Illinois	131
Louisiana	5
Minnesota	66
Missouri	10
North Carolina	47
Pennsylvania	167
Rhode Island	1
Wisconsin	156
Dysentery:	
Illinois	136
Illinois (amebic)	1
Illinois (bacillary)	15
Minnesota	1
Missouri	3
Pennsylvania	1
German measles:	
Colorado	2
Illinois	15
North Carolina	13
Pennsylvania	30
Rhode Island	2
Wisconsin	12
Hookworm disease:	
Louisiana	8
Impetigo contagiosa:	
Colorado	1
Lead poisoning:	
Illinois	12
Pennsylvania	2
Leprosy:	
Louisiana	1
Lethargic encephalitis:	
Illinois	13
Louisiana	4
Minnesota	1
Missouri	2
Pennsylvania	11
Wisconsin	2
Ludwig's angina:	
Illinois	3
Mumps:	
Colorado	29
Idaho	12
Illinois	102

	Cases
Mumps—Continued.	
Missouri	11
Pennsylvania	284
Rhode Island	25
Wisconsin	248
Ophthalmia neonatorum:	
Colorado	1
Illinois	6
Minnesota	1
North Carolina	1
Pennsylvania	16
Rhode Island	2
Wisconsin	1
Paratyphoid fever:	
Colorado	2
Illinois	5
Louisiana	2
North Carolina	4
Puerperal septicemia:	
Illinois	16
Pennsylvania	25
Rabies in animals:	
Illinois	6
Louisiana	6
Missouri	4
Rhode Island	1
Septic sore throat:	
Illinois	11
Missouri	21
North Carolina	13
Tetanus:	
Illinois	9
Louisiana	7
Missouri	1
Pennsylvania	6
Trachoma:	
Colorado	1
Illinois	2
Missouri	92
Pennsylvania	6
Wisconsin	2
Tularaemia:	
Minnesota	1
Wisconsin	1
Undulant fever:	
Idaho	1
Illinois	5
Louisiana	11
Minnesota	5
Missouri	13
Pennsylvania	6
Wisconsin	4
Vincent's angina:	
Colorado	3
Illinois	13
Whooping cough:	
Colorado	57
Idaho	3
Illinois	1,016
Louisiana	19
Minnesota	71
Missouri	413
North Carolina	303
Pennsylvania	1,541
Rhode Island	20
Wisconsin	559

Cases of Certain Communicable Diseases Reported for the Month of June, 1931, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	107	14	115	148	92	0	52	12	54
New Hampshire		1			4	0		0	
Vermont	104	2	228	79	22	36	14	0	25
Massachusetts	1,076	191	2,360	597	899	0	513	18	505
Rhode Island	31	27	506	233	122	0	51	1	35
Connecticut	397	15	1,211	222	122	0	102	14	245
New York	2,490	546	9,950	1,471	2,418	210	1,828	100	2,032
New Jersey	1,273	173	3,066	277	813	1	431	20	1,370
Pennsylvania	1,801	289	9,061	1,533	1,839	1	806	52	1,107
Ohio	1,395	104	3,793	1,481	993	126	707	44	727
Indiana	194	105	1,321	67	354	350	541	15	265
Illinois	1,447	451	6,290	747	1,465	246	758	37	957
Michigan	1,309	149	1,366	658	1,634	82	491	22	1,286
Wisconsin	1,397	34	2,626	2,048	253	38	182	8	471
Minnesota	760	73	508		195	49	328	10	166
Iowa	163	13	125	83	237	106	33	10	168
Missouri	170	79	636	86	382	181	262	35	324
North Dakota	69	15	172	40	51	48	16	5	44
South Dakota	48	19	36	11	34	38	16	7	38
Nebraska	125	25	17	254	83	80	17	0	51
Kansas	208	31	365	394	82	224	123	23	221
Delaware	8	6	267	18	20	0	17	1	26
Maryland	210	55	1,868	201	152	0	268	29	352
District of Columbia	78	38	313		57	0	88	0	52
Virginia	336	61	1,159		83	9	199	82	546
West Virginia	163	28	771		74	11	41	27	250
North Carolina	193	56	2,307		98	6		98	1,091
South Carolina	177	110	550	73	6	18	133	126	250
Georgia	60	18	270	105	102	0	224	96	94
Florida	41	15	270	9	13	0	33	10	32
Kentucky [1]									
Tennessee	69	27	1,327	57	151	55	242	70	251
Alabama	57	32	241	59	39	46	467	69	90
Mississippi	319	22	134	162	29	143	163	101	444
Arkansas	54	5	146	18	26	113	[2] 24	53	41
Louisiana	24	87	15	12	49	75	[2] 203	104	21
Oklahoma [3]	63	29	58	7	39	196	51	50	53
Texas		61			98			61	
Montana	65	3	58	13	26	14	27	19	58
Idaho	6	11	15	8	39	30	21	10	22
Wyoming	30	5	52	35	32	3		0	29
Colorado	169	23	480	153	73	26	75	23	248
New Mexico	77	25	180	23	18	1	50	12	54
Arizona	20	8	148	5	5	4	82	20	23
Utah [1]									
Nevada	7		33		5		7	0	2
Washington	366	31	388	138	81	90	165	23	405
Oregon	147	14	160	128	47	52	36	12	95
California	936	244	2,671	612	362	76	932	64	817

[1] Reports received weekly. [2] Pulmonary. [3] Exclusive of Oklahoma City and Tulsa.

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Case Rates per 100,000 Population (Annual Basis) for the Month of June, 1931

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	163	21	175	225	140	0	79	18	82
New Hampshire	----	3	----	----	10	0	----	0	----
Vermont	351	7	770	267	74	122	47	0	84
Massachusetts	305	54	668	169	254	0	145	5	143
Rhode Island	54	47	882	406	213	0	89	2	61
Connecticut	236	11	901	165	91	0	76	10	182
New York	236	52	942	139	229	20	173	9	192
New Jersey	367	45	899	81	238	0	176	6	402
Pennsylvania	225	36	1,132	191	230	0	101	6	138
Ohio	251	19	683	267	179	23	127	8	131
Indiana	72	39	491	25	131	130	201	6	98
Illinois	227	71	985	117	229	39	119	6	150
Michigan	341	36	333	161	399	20	120	5	314
Wisconsin	571	14	1,073	837	103	16	74	3	193
Minnesota	358	34	239	----	92	23	154	5	78
Iowa	80	6	61	41	116	52	16	5	82
Missouri	57	26	212	29	127	60	87	12	108
North Dakota	123	27	306	71	91	85	28	9	78
South Dakota	83	33	63	19	59	66	28	12	66
Nebraska	110	22	15	223	73	70	15	0	45
Kansas	134	20	234	253	53	144	79	15	142
Delaware	41	30	1,352	91	101	0	86	5	132
Maryland	161	40	1,374	148	112	0	197	21	259
District of Columbia	193	94	773	----	141	0	217	0	128
Virginia	168	30	579	----	41	4	99	41	273
West Virginia	113	19	533	----	51	8	28	19	173
North Carolina	72	21	865	----	37	2	----	37	409
South Carolina	123	77	383	51	4	13	93	88	174
Georgia	25	8	113	44	43	0	94	40	39
Florida	33	12	215	7	10	0	26	8	25
Kentucky [1]	----	----	----	----	----	----	----	----	----
Tennessee	32	12	609	26	69	25	111	32	115
Alabama	26	15	100	27	18	21	212	31	41
Mississippi	191	13	80	97	17	85	97	60	265
Arkansas	35	3	95	12	17	74	[2] 16	35	27
Louisiana	14	49	9	7	28	43	[2] 115	59	12
Oklahoma [3]	37	17	34	4	23	114	30	29	31
Texas	----	12	----	----	20	----	----	12	----
Montana	147	7	131	29	59	32	61	43	131
Idaho	16	30	41	22	166	82	57	27	60
Wyoming	159	27	276	186	170	16	----	0	154
Colorado	166	27	558	178	85	30	87	27	288
New Mexico	217	71	503	65	51	3	141	34	152
Arizona	54	22	402	14	14	11	223	54	63
Utah [1]	----	----	----	----	----	----	----	----	----
Nevada	92	----	433	----	66	----	92	0	26
Washington	280	24	297	106	62	60	126	18	310
Oregon	184	17	200	160	59	65	45	15	119
California	191	50	546	125	74	16	191	13	167

[1] Reports received weekly. [2] Pulmonary. [3] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,455,000. The estimated population of the 90 cities reporting deaths is more than 31,915,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended October 17, 1931, and October 18, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	2,277	1,563	
97 cities	448	441	753
Measles:			
45 States	682	876	
97 cities	167	220	
Meningococcus meningitis:			
46 States	55	86	
97 cities	24	36	
Poliomyelitis:			
46 States	562	569	
Scarlet fever:			
46 States	2,383	2,317	
97 cities	648	759	616
Smallpox:			
46 States	77	188	
97 cities	5	10	7
Typhoid fever:			
46 States	811	770	
97 cities	118	104	108
Deaths reported			
Influenza and pneumonia:			
90 cities	418	463	
Smallpox:			
90 cities	0	0	

City reports for week ended October 17, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	1	0		0	0	0	1
New Hampshire:								
Concord	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	1
Massachusetts:								
Boston	6	19	10	1	1	5	2	19
Fall River	5	3	3	1	0	1	0	0
Springfield	0	4	1		0	0	1	0
Worcester	3	5	3		0	0	34	0
Rhode Island:								
Pawtucket	0	1	0		0	0	0	2
Providence	0	5	1		0	22	0	1
Connecticut:								
Bridgeport	0	3	1	1	0	0	0	4
Hartford	1	3	0		0	0	2	1
New Haven	0	1	0	1	0	1	0	2

City reports for week ended October 17, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC								
New York:								
Buffalo	4	11	4		0	1	0	6
New York	17	102	51	11	10	15	15	83
Rochester	3	2	1		0	2	2	0
Syracuse	0	2	0		0	0	1	1
New Jersey:								
Camden	0	5	9		0	0	0	3
Newark	7	12	3	4	0	1	1	8
Trenton	0	1	0		0	0	0	1
Pennsylvania:								
Philadelphia	6	43	4		3	5	3	15
Pittsburgh	17	16	3		0	20	18	23
Reading	2	1	0		0	0	0	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	7	9	9		0	0	0	5
Cleveland	13	37	3	8	1	7	18	16
Columbus	2	4	20	1	0	1	0	3
Toledo	11	6	3		0	1	0	6
Indiana:								
Fort Wayne	0	2	1		0	0	0	4
Indianapolis	6	12	1		0	3	8	3
South Bend	0	1	0		0	0	0	1
Terre Haute	1	1	2		0	0	0	1
Illinois:								
Chicago	15	80	46	4	2	5	3	25
Peoria	1	1	2		0	0	0	1
Springfield	1	0	1		0	0	0	1
Michigan:								
Detroit	3	51	13		0	4	2	8
Flint	6	3	0		0	0	7	4
Grand Rapids	0	2	2		0	0	0	2
Wisconsin:								
Kenosha	1	0	0		0	0	2	0
Madison	1	0	0			0	11	
Milwaukee	16	9	3	1	1	1	17	1
Racine	1	1	0		0	0	13	0
Superior	0	0	0		0	0	3	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	2	0	0		0	0	0	0
Minneapolis	17	26	13		0	0	13	6
St. Paul	9	9	2		0	1	0	4
Iowa:								
Davenport	0	0	0			0	0	
Des Moines	0	2	1			0	0	
Sioux City	1	2	5			0	1	
Waterloo	1	1	1			0	1	
Missouri:								
Kansas City	2	6	10		0	1	0	11
St. Joseph	0	0	5		0	0	0	5
St. Louis	9	32	14			0	2	1
North Dakota:								
Fargo	1	0	0		0	0	0	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	13	0	0			14	0	
Sioux Falls	0	0	1			0	0	
Nebraska:								
Omaha	3	12	9		0	0	0	5
Kansas:								
Topeka	4	2	4		0	1	2	0
Wichita	4	2	4		0	2	1	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	2		0	1	0	2
Maryland:								
Baltimore	8	23	7	1	0	0	5	16
Cumberland	0	1	6		0	0	0	1
Frederick	0	0	[illegible]		0	0	0	0

City reports for week ended October 17, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
SOUTH ATLANTIC—con.								
District of Columbia:								
Washington	0	13	9	----------	0	1	0	9
Virginia:								
Lynchburg	0	3	3	----------	0	2	0	2
Norfolk	8	3	5	----------	0	0	0	0
Richmond	0	20	17	----------	0	0	0	1
Roanoke	0	4	7	----------	0	0	0	2
West Virginia:								
Charleston	1	1	7	----------	0	0	0	0
Wheeling	2	0	0	----------	0	0	0	0
North Carolina:								
Raleigh	0	4	1	----------	0	1	0	3
Wilmington	0	2	3	----------	0	0	0	2
Winston-Salem	5	5	7	----------	0	0	2	1
South Carolina:								
Charleston	0	2	6	2	0	0	0	2
Columbia	0	1	2	----------	0	0	0	1
Greenville	0	1	3	----------	0	0	0	0
Georgia:								
Atlanta	1	9	2	3	0	0	0	1
Brunswick	0	0	0	----------	0	0	0	0
Savannah	0	2	4	----------	0	0	1	0
Florida:								
Miami	0	2	1	----------	0	14	0	0
Tampa	0	1	9	----------	0	2	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	1	----------	0	0	0	0
Tennessee:								
Memphis	0	7	16	----------	0	0	2	4
Nashville	0	3	7	----------	0	0	0	3
Alabama:								
Birmingham	0	5	10	----------	0	0	0	2
Mobile	0	1	1	----------	1	0	0	2
Montgomery	0	3	5	----------	----------	0	4	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	1	2	4	----------	----------	0	0	----------
Little Rock	1	1	4	----------	0	0	0	2
Louisiana:								
New Orleans	0	10	6	2	3	1	0	6
Shreveport	0	1	1	----------	0	2	0	2
Oklahoma:								
Muskogee	0	5	6	----------	0	0	2	0
Tulsa	0	4	43	----------	----------	0	0	----------
Texas:								
Dallas	1	15	10	1	1	0	0	0
Fort Worth	0	2	1	----------	0	0	0	0
Galveston	0	0	0	----------	0	0	0	1
Houston	0	7	5	----------	0	0	0	4
San Antonio	0	3	0	----------	0	0	0	2
MOUNTAIN								
Montana:								
Billings	0	0	0	----------	0	1	0	0
Great Falls	1	0	0	----------	0	0	0	2
Helena	0	0	0	----------	0	5	0	0
Missoula	0	0	0	----------	0	0	0	1
Idaho:								
Boise	----------	0	----------	----------	----------	----------	----------	----------
Colorado:								
Denver	12	7	6	----------	1	3	2	6
Pueblo	2	0	0	----------	0	0	0	0
New Mexico:								
Albuquerque	2	1	3	----------	0	0	0	0
Arizona:								
Phoenix	0	0	0	----------	0	0	0	2
Utah:								
Salt Lake City	9	2	0	----------	3	0	1	0
Nevada:								
Reno	0	0	0	----------	0	0	0	1

City reports for week ended October 17, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
PACIFIC								
Washington:								
Seattle	33	5	0	----------	----------	10	2	----------
Spokane	2	2	0	----------	----------	0	0	----------
Tacoma	3	4	2	----------	0	0	5	2
Oregon:								
Portland	17	6	0	----------	1	1	12	4
Salem	0	0	1	4	0	0	0	0
California:								
Los Angeles	4	27	19	40	2	7	4	13
Sacramento	1	2	3	----------	0	19	0	7
San Francisco	15	12	0	2	0	13	2	5

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	2	1	0	0	0	0	0	1	0	0	28
New Hampshire:											
Concord	0	1	0	0	0	1	0	0	0	0	10
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	2
Massachusetts:											
Boston	32	25	0	0	0	8	2	1	0	10	209
Fall River	2	6	0	0	0	0	1	0	0	1	23
Springfield	3	0	0	0	0	2	1	0	0	2	24
Worcester	7	8	0	0	0	0	1	0	0	10	38
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	10
Providence	4	9	0	0	0	5	1	0	0	1	63
Connecticut:											
Bridgeport	3	1	0	0	0	0	0	1	0	0	28
Hartford	2	4	0	0	0	2	1	1	0	9	32
New Haven	2	2	0	0	0	0	1	0	0	3	37
MIDDLE ATLANTIC											
New York:											
Buffalo	12	12	0	0	0	7	1	4	0	12	119
New York	49	42	0	0	0	100	27	18	5	114	1,201
Rochester	3	13	0	0	0	3	0	0	0	3	59
Syracuse	3	7	0	0	0	1	1	0	0	4	50
New Jersey:											
Camden	1	3	0	0	0	0	0	0	0	1	23
Newark	5	5	0	0	0	3	1	0	0	44	79
Trenton	1	8	0	0	0	8	0	0	0	1	36
Pennsylvania:											
Philadelphia	35	54	0	0	0	26	8	11	2	115	397
Pittsburgh	15	21	0	0	0	8	1	2	0	22	177
Reading	1	0	0	0	0	2	0	0	0	1	5
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	13	25	0	0	0	7	1	0	0	2	114
Cleveland	17	26	0	0	0	12	1	2	0	82	176
Columbus	7	6	0	0	0	3	1	1	0	2	62
Toledo	6	8	0	0	0	3	1	0	0	14	63
Indiana:											
Fort Wayne	1	0	0	0	0	0	1	1	0	0	--------
Indianapolis	10	6	1	0	0	4	2	1	0	12	--------
South Bend	2	0	0	0	0	0	0	0	0	1	16
Terre Haute	2	1	0	0	0	2	0	1	0	0	25

City reports for week ended October 17, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
EAST NORTH CENTRAL—continued											
Illinois:											
Chicago	58	87	0	0	0	35	5	2	1	107	566
Peoria	6	3	0	0	0	0	0	0	0	5	23
Springfield	2	2	0	0	0	0	0	0	0	0	14
Michigan:											
Detroit	48	41	1	0	0	22	3	4	0	85	249
Flint	9	6	0	0	0	2	0	0	0	5	24
Grand Rapids	7	9	0	0	0	2	0	0	0	3	34
Wisconsin:											
Kenosha	1	2	0	0	0	0	0	0	0	0	11
Madison	2	1	0	0	--------	--------	0	0	--------	1	--------
Milwaukee	13	11	0	0	0	4	1	1	0	51	73
Racine	2	7	0	0	0	1	0	0	0	1	7
Superior	2	0	0	0	0	0	0	0	0	0	7
WEST NORTH CENTRAL											
Minnesota:											
Duluth	5	2	0	0	0	1	0	3	0	0	20
Minneapolis	27	14	0	0	0	0	1	3	0	11	102
St. Paul	14	6	0	0	0	0	0	2	0	1	49
Iowa:											
Davenport	1	0	0	0	--------	--------	0	0	--------	1	--------
Des Moines	5	2	0	1	--------	--------	0	0	--------	0	36
Sioux City	2	1	0	2	--------	--------	0	2	--------	1	--------
Waterloo	1	0	0	0	--------	--------	0	1	--------	2	--------
Missouri:											
Kansas City	8	4	0	0	0	9	1	1	1	16	103
St. Joseph	2	1	0	0	0	1	0	0	0	0	30
St. Louis	24	13	1	0	0	10	4	4	1	34	170
North Dakota:											
Fargo	1	3	0	0	0	0	0	0	0	5	4
Grand Forks	1	0	0	0	--------	--------	0	0	--------	3	--------
South Dakota:											
Aberdeen	0	2	0	0	--------	--------	0	0	--------	0	--------
Sioux Falls	0	0	0	0	--------	--------	0	0	--------	0	6
Nebraska:											
Omaha	3	2	0	1	0	1	0	0	0	0	49
Kansas:											
Topeka	4	0	0	0	0	0	0	0	0	1	15
Wichita	3	3	0	0	0	1	0	1	0	0	28
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	0	0	0	0	0	0	0	0	2	25
Maryland:											
Baltimore	10	10	0	0	0	12	6	7	0	118	170
Cumberland	0	1	0	0	0	0	0	2	0	3	9
Frederick	0	0	0	0	0	0	0	0	0	0	2
District of Col.:											
Washington	12	11	0	0	0	12	2	0	0	7	114
Virginia:											
Lynchburg	1	0	0	0	0	1	0	3	0	0	11
Norfolk	1	6	0	0	0	2	0	0	0	2	--------
Richmond	7	19	0	0	0	4	1	0	0	1	48
Roanoke	3	2	0	0	0	0	1	0	0	1	13
West Virginia:											
Charleston	2	1	0	0	0	0	1	[1] 4	1	5	14
Wheeling	2	1	0	0	0	2	0	1	1	0	17
North Carolina:											
Raleigh	1	4	0	0	0	0	0	0	0	3	9
Wilmington	1	0	0	0	0	0	0	0	0	1	13
Winston-Salem	3	6	0	0	0	0	1	0	0	5	13
South Carolina:											
Charleston	1	1	0	0	0	3	1	1	0	0	18
Columbia	1	2	0	0	0	0	1	1	0	0	9
Greenville	1	0	0	0	0	0	0	0	0	0	--------

[1] 3 cases in nonresidents.

City reports for week ended October 17, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
SOUTH ATLANTIC—continued											
Georgia:											
Atlanta	8	3	0	0	0	4	1	3	1	1	52
Brunswick	0	0	0	0	0	0	0	0	0	0	3
Savannah	1	2	0	0	0	0	0	1	0	1	18
Florida:											
Miami	1	1	0	0	0	1	0	0	0	0	21
Tampa	1	0	0	0	0	1	0	2	0	0	13
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	3	0	0	0	0	0	0	0	0	9
Tennessee:											
Memphis	4	2	0	1	0	4	3	3	1	16	69
Nashville	3	0	0	0	0	4	2	1	0	5	37
Alabama:											
Birmingham	5	4	0	0	0	3	2	3	0	0	40
Mobile	1	1	0	0	0	2	0	2	0	0	26
Montgomery	1	2	0	0	--------	--------	0	0	--------	0	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	1	0	0	--------	--------	0	0	--------	1	--------
Little Rock	2	0	0	0	0	0	0	0	0	0	2
Louisiana:											
New Orleans	3	4	0	0	0	16	3	7	3	1	140
Shreveport	0	1	0	0	0	1	0	0	0	4	31
Oklahoma:											
Muskogee	1	1	0	0	0	0	0	1	0	0	--------
Tulsa	3	4	0	0	--------	--------	1	0	--------	0	--------
Texas:											
Dallas	5	3	0	0	0	4	2	4	0	2	57
Forth Worth	2	5	0	0	0	0	1	2	0	0	--------
Galveston	0	2	0	0	0	1	0	0	0	0	7
Houston	1	0	0	0	0	3	1	1	0	0	47
San Antonio	0	1	0	0	0	9	1	0	0	0	47
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	1	0	0	0	13
Great Falls	1	0	0	0	0	0	0	0	0	0	8
Helena	1	0	0	0	0	0	0	0	0	3	5
Missoula	0	1	0	0	0	0	0	0	0	0	8
Idaho:											
Boise	0	--------	0	--------	--------	--------	0	--------	--------	--------	--------
Colorado:											
Denver	8	4	0	0	0	5	1	1	2	4	78
Pueblo	1	0	0	0	0	0	0	0	0	0	1
New Mexico:											
Albuquerque	1	0	0	0	0	3	1	0	0	1	8
Arizona:											
Phoenix	0	0	0	0	0	0	0	0	0	0	--------
Utah:											
Salt Lake City	2	0	1	0	0	0	3	0	0	0	26
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	9
PACIFIC											
Washington:											
Seattle	7	9	0	0	--------	--------	2	1	--------	1	--------
Spokane	4	2	1	0	--------	--------	0	0	--------	2	--------
Tacoma	2	1	1	0	0	0	0	0	0	0	29
Oregon:											
Portland	5	0	2	1	0	1	1	1	0	0	62
Salem	0	0	0	0	0	0	2	0	0	0	--------
California:											
Los Angeles	15	39	0	0	0	18	2	1	0	20	247
Sacramento	3	1	0	0	0	3	1	0	0	2	29
San Francisco	9	4	1	1	0	12	1	0	0	10	--------

City reports for week ended October 17, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	0	1	0	0	0	0	3	8	7
Springfield	0	0	0	0	0	0	0	4	1
Worcester	0	0	0	0	0	0	0	7	1
Rhode Island:									
Providence	0	0	0	0	0	0	0	1	0
Connecticut:									
Bridgeport	0	0	1	0	0	0	0	2	0
Hartford	0	0	0	0	0	0	1	8	0
MIDDLE ATLANTIC									
New York:									
Buffalo	0	0	0	0	0	0	1	0	1
New York	3	4	2	0	0	0	12	59	11
Rochester	0	0	0	0	0	0	1	4	0
New Jersey:									
Newark	0	0	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	2	1	0	0	0	0	0	5	1
Pittsburgh	3	2	0	0	0	0	0	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	1	0	0	0	0	1	0	0
Cleveland	1	0	0	0	0	1	2	2	1
Toledo	0	0	1	1	0	0	0	0	0
Indiana:									
Fort Wayne	1	0	0	0	0	0	0	1	0
Indianapolis	1	1	0	0	0	0	1	1	0
Illinois:									
Chicago	6	2	0	0	0	0	4	9	2
Peoria	0	0	0	0	0	0	0	1	0
Michigan:									
Detroit	1	1	0	0	0	0	3	4	2
Flint	1	0	0	0	0	0	0	1	0
Grand Rapids	0	1	0	0	0	0	0	0	1
Wisconsin:									
Kenosha	0	0	0	0	0	0	0	1	0
Madison	0	0	0	0	0	0	0	4	0
Milwaukee	0	0	1	1	0	0	1	4	0
Racine	0	0	0	0	0	0	0	1	0
Superior	0	0	0	0	0	0	0	2	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	1	0
Minneapolis	0	0	0	0	0	0	0	11	1
St. Paul	0	0	0	0	0	0	0	25	1
Iowa:									
Des Moines	0	0	0	0	0	0	1	2	0
Waterloo	0	0	0	0	0	0	0	1	0
Missouri:									
St. Louis	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	0	0	0	0	0	1	1	0
West Virginia:									
Charleston	0	0	0	0	0	0	0	[1] 2	0
North Carolina:									
Raleigh	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	2	0	0	0	0
Georgia:									
Savannah [2]	0	0	0	0	1	0	0	0	0

[1] 1 case in nonresident.
[2] Typhus fever: 2 cases at Savannah, Ga.

City reports for week ended October 17, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST SOUTH CENTRAL									
Tennessee									
Nashville	1	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	0	0	0	0	0	1	1	0	0
WEST SOUTH CENTRAL									
Louisiana									
New Orleans	1	0	0	0	3	0	1	0	1
Texas									
Dallas	0	0	0	0	0	0	0	1	0
Fort Worth	0	0	0	0	0	0	0	1	0
PACIFIC									
Washington.									
Seattle	1	0	0	0	0	0	0	1	0
Oregon:									
Portland	1	0	0	0	0	0	1	0	0
California									
Los Angeles	0	0	0	0	0	0	1	1	1
Sacramento	0	0	0	0	0	0	1	1	0
San Francisco	0	1	0	0	1	0	0	0	0

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended October 17, 1931, compared with those for a like period ended October 18, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, September 13 to October 17, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930
98 cities	34	46	45	56	56	60	[2] 65	70	[3] 70	70
New England	36	34	38	56	50	53	72	58	46	70
Middle Atlantic	22	36	25	31	25	40	40	40	34	33
East North Central	29	74	42	74	44	70	[4] 34	99	61	91
West North Central	42	48	71	58	90	60	99	68	128	76
South Atlantic	73	46	67	100	150	68	132	116	170	100
East South Central	93	24	128	30	140	102	221	96	233	143
West South Central	57	63	101	136	108	104	[5] 75	59	101	118
Mountain	17	26	52	62	78	9	[3] 36	44	[3] 54	18
Pacific	29	12	41	26	41	51	47	81	27	87

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] South Bend, Ind., Shreveport, La., and Boise, Idaho, not included.
[3] Boise, Idaho, not included.
[4] South Bend, Ind., not included.
[5] Shreveport, La., not included.

Summary of weekly reports from cities, September 13 to October 17, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

MEASLES CASE RATES

	Week ended—									
	Sept. 19, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930
98 cities	22	16	15	18	18	19	[2] 28	22	[3] 26	35
New England	31	19	31	46	24	36	137	34	70	48
Middle Atlantic	18	16	9	13	12	12	15	15	20	22
East North Central	17	11	16	13	12	5	[4] 13	11	13	14
West North Central	13	19	4	29	10	70	2	77	10	143
South Atlantic	14	22	8	10	2	22	6	12	14	8
East South Central	0	0	0	66	29	0	0	18	0	6
West South Central	17	0	3	10	17	7	[5] 4	0	10	3
Mountain	122	44	44	26	35	70	[3] 54	115	[3] 81	194
Pacific	53	18	51	16	78	22	106	20	96	57

SCARLET FEVER CASE RATES

98 cities	57	61	57	71	65	71	[2] 100	95	[3] 101	120
New England	87	77	53	87	132	80	144	116	137	162
Middle Atlantic	43	45	45	32	51	46	76	51	74	85
East North Central	62	90	62	117	62	106	[4] 113	135	139	177
West North Central	59	45	65	77	94	72	86	93	94	116
South Atlantic	71	44	67	62	59	76	142	126	124	126
East South Central	81	36	93	114	70	66	233	161	70	132
West South Central	47	52	34	52	37	35	[5] 57	35	41	73
Mountain	87	70	122	97	96	115	[3] 135	291	[3] 45	238
Pacific	55	67	71	75	72	73	67	75	110	51

SMALLPOX CASE RATES

98 cities	1	4	0	3	0	1	[2] 1	2	[3] 1	2
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	1	9	0	2	0	1	[4] 0	2	0	4
West North Central	0	21	6	14	2	0	2	6	6	0
South Atlantic	0	0	0	0	0	2	4	0	0	0
East South Central	0	0	0	0	0	0	0	0	6	0
West South Central	0	0	0	3	0	3	[5] 0	3	0	3
Mountain	0	0	0	0	0	0	[3] 0	0	[3] 0	26
Pacific	4	4	0	16	0	0	10	6	2	0

TYPHOID FEVER CASE RATES

98 cities	42	22	21	17	21	20	[2] 20	20	[3] 18	16
New England	22	12	5	12	17	12	19	22	10	10
Middle Atlantic	16	15	16	13	21	14	15	14	16	10
East North Central	91	11	15	9	9	9	[4] 6	9	8	7
West North Central	38	29	36	15	13	14	11	10	33	15
South Atlantic	26	68	43	56	65	42	53	70	49	62
East South Central	47	48	47	18	52	60	64	42	52	42
West South Central	44	63	47	35	24	52	[5] 82	49	41	21
Mountain	26	0	26	44	26	115	[3] 36	44	[3] 9	35
Pacific	35	14	10	12	16	16	10	16	4	22

[2] South Bend, Ind., Shreveport, La., and Boise, Idaho, not included.
[3] Boise, Idaho, not included.
[4] South Bend, Ind., not included.
[5] Shreveport, La., not included.

Summary of weekly reports from cities, September 13 to October 17, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

INFLUENZA DEATH RATES

	Week ended—									
	Sept. 13, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930
91 cities	3	3	2	2	3	2	[2] 3	5	[3] 5	5
New England	2	2	0	2	2	0	2	5	2	7
Middle Atlantic	3	2	1	2	3	2	4	6	6	4
East North Central	3	2	3	2	2	1	[4] 2	3	2	4
West North Central	6	0	0	0	12	0	0	6	0	3
South Atlantic	4	0	4	4	0	2	0	2	0	6
East South Central	0	26	6	13	6	13	6	0	6	0
West South Central	0	7	0	4	0	11	[5] 7	11	14	7
Mountain	0	18	0	0	0	18	[3] 18	9	[3] 36	9
Pacific	2	0	0	5	0	2	5	0	5	7

PNEUMONIA DEATH RATES

	Sept. 13, 1931	Sept. 20, 1930	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930
91 cities	60	57	52	57	53	58	[2] 55	71	[3] 64	72
New England	50	56	67	39	58	44	77	70	75	87
Middle Atlantic	66	65	55	72	60	59	56	74	63	70
East North Central	45	42	38	47	35	53	[4] 36	55	45	50
West North Central	44	75	44	36	59	69	56	87	100	54
South Atlantic	57	56	51	56	61	52	79	86	87	96
East South Central	57	71	32	65	63	104	69	123	69	162
West South Central	93	46	52	71	66	71	[5] 77	110	59	89
Mountain	78	115	70	53	61	132	[3] 36	97	[3] 90	194
Pacific	84	40	86	40	53	40	55	40	65	65

[2] South Bend, Ind., Shreveport, La., and Boise, Idaho, not included.
[3] Boise, Idaho, not included.
[4] South Bend, Ind., not included.
[5] Shreveport, La., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended October 10, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended October 10, 1931, as follows:

Province	Cerebrospinal fever	Dysentery	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia				2		2
New Brunswick	1			2		1
Quebec	2			140		
Ontario	2		1	8	1	30
Manitoba	1					5
Saskatchewan				1	3	5
Alberta						3
British Columbia		1		1		7
Total	6	1	1	154	4	53

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended October 17, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended October 17, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	50	Ophthalmia neonatorum	1
Diphtheria	33	Poliomyelitis	126
Erysipelas	4	Scarlet fever	49
German measles	2	Tuberculosis	28
Measles	57	Typhoid fever	30
Mumps	5	Whooping cough	26

CZECHOSLOVAKIA

Communicable diseases—August, 1931.—During the month of August, 1931, certain communicable diseases were reported in the Republic of Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	17		Paratyphoid fever	39	4
Cerebrospinal meningitis	12	4	Puerperal fever	34	16
Diphtheria	1,258	96	Scarlet fever	1,061	20
Dysentery	149	18	Trachoma	129	
Malaria	54		Typhoid fever	750	47

JAMAICA

Communicable diseases—Four weeks ended October 10, 1931.—During the four weeks ended October 10, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica, outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Scarlet fever		3
Chicken pox		1	Puerperal fever		4
Diphtheria		2	Tuberculosis	24	80
Dysentery		4	Typhoid fever	9	85
Leprosy		4			

MEXICO

Tampico—Communicable diseases—September, 1931.—During the month of September, 1931, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	1		Paratyphoid fever	1	3
Diphtheria	2		Tuberculosis	54	25
Enteritis (various)		37	Typhoid fever	4	3
Malaria	206	17	Whooping cough	19	
Measles	1	1			

PERSIA

Measures against cholera.—On October 23, 1931, a case of cholera was reported at Mohammerah, Persia, a new focus. On the same date 1 case was reported at Abadan and 12 cases with 7 deaths were reported at Ahwaz.

In connection with the occurrence of cholera in Persia, the American minister at Teheran states that the Persian Government is enforcing quarantine regulations on all travelers from Barra, Mesopotamia, and the Persian Gulf ports, and that anticholera inoculation was being carried on at Ahwaz. It was further reported that the Pasteur Institute at Teheran had been instructed to prepare an adequate supply of cholera vaccine, of which over 40,000 doses had already been dispatched to Khouzistan.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended—												
						August, 1931					September, 1931				October, 1931			
						1	8	15	22	29	5	12	19	26	3	10	17	24
Ceylon: Colombo	C		1	1		1	1	1										
	D		1	1		1	1	1										
China:																		
Canton	C	1	2	1						1	1							
	D		1															
Shanghai	C				1		1	5	1	1	58	30	36	35	19	17		
	D										3	4	2	5	8			
Swatow	C			10	7													
Tientsin	C		1	10														
	D		1	1														
India	C	11,462	13,604	18,001	22,074	7,357	9,848	9,817	9,492	10,734								
	D	5,767	7,270	10,337	12,093	4,029	5,584	5,411	5,252	6,041								
Bombay	C	2			23	9	18	6	11	27	5	5	5	1	1	2		
	D	1			16	4	9	7	5	9	5	2	1		1	2		
Calcutta	C	310	265	292	237	42	27	20	21	10	3	15	18	18	23	3		
	D	176	149	163	155	10	7	7	6	4	2	3	6	6	12			
Chittagong	C																1	
Karikal	C	19	12					1		1			1					
	D	14	7					1		1			1					
Madras	C	26	52	9	4	1		2	3	3	1	1						
	D	13	17	4														
Moulmein	C				1													
	D				1													
Negapatam	C									1								
Rangoon	C		2	4	4		1	1						1				
	D		1	2	1		1	1						1				
Vizagapatam	C			1														
India (French):																		
Chandernagor	C	6	4	3	5	1	4	2			1	1						
	D	5	4	3	1	1	4	2			1	1						
Pondicherry	C	24	17	3	3	1	1	1		2			2					
	D	4	7	3	3	1		1		1			1					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24
India (Portuguese)	C			1	2		1											
	D				1		1											
Indo-China (see also table below):																		
Cochin-China—Rachgia	C					P												
Pnompenh	C	2		1	5		1		1			1	1		1			
	D	1	2	1	2		1					1	1		1			
Saigon and Cholon	C	27	104	61	14											1		
	D	22	76	41	7											1		
Iraq:																		
Abulkhasib	C									6								
	D									5								
Amara	C								2	22	55	8	1			2	2	2
	D								1	21	30	7	1				1	1
Amara Province	C									6	11	106	73	32	21	15	27	13
	D									5	4	67	44	29	24	14	17	10
Basra	C					3	9	263	272	148		54	91	77	19	29	32	38
	D					2	8	140	137	76		20	48	34	11	13	23	7
Basra Province	C								5	14	6	10	23	26	14	1	1	3
	D								2	10	3	7	10	9	8	1	1	1
Dinwaniyah	C													1				
Dinwaniyah Province	C													15	8	14	24	22
	D													11	6	5	22	10
Iwaniyah	C													22				
	D													15				
Muntafiq Province	C									10	21	66	128	55	54	45	55	17
	D									8	20	42	75	38	57	28	37	10
Nasiriyah	C										22	50	16	4	4	13	7	4
	D										15	40	20	3	4	18	3	3
Suqelshuyukh	C									2								
	D									2								
Persia:																		
Abadan	C																	1
Ahwaz	C																	12
	D																	7

Mohammerah	C																	1
Rafsanjan [1]	C		36															
	D		14															
Philippine Islands: [2] Provinces—																		
Capiz	C	29	17	4							9	9	17	49	21	5	4	
	D	21	15	4							5	6	5	35	16	5	3	
Cebu	C						1	1	1									
	D						1	1	1									
Iloilo	C			26	27													
	D			21	25													
Negros, Occidental	C			2														
	D			1														
Pampanga	C		1															
Siam	C	16	14	4	3				1	1								
	D	4	5	2	1					1								
Bangkok	C	3	3	1	4				1	1								
	D	2	1	1	2													
On vessel:																		
S. S. Arankola, at Rangoon from Calcutta	C		1															
S. S. City of Eastborne, at Calcutta from Cocanada	C			1														
S. S. Tairea, at Penang, from Calcutta	C			1														
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C				1													
	D				1													
S. S. Kohistan, at Basra from Bushire, Persia	C				2													
S. S. Cathay, at Kobe, Japan, from Shanghai	C								4									
	D								1									
S. S. Kasagi Maru, at Moji, from Shanghai	C										1							
S. S. Ankoo, at Nagasaki, from Shanghai	C											2						
	D											1						

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			Aug. 1-10, 1931
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	
Indo-China (French) (see also table above):														
Cambodia [3]	C	125	100	113	33	44	40	83	96	129	72	82	87	12
	D	80	29	70	20	22	21	45	64				60	2
Cochin-China [3]	C	29	105	107	47	52	75	71	69		66	30	47	39
	D	18	73	74	36	40	57	52	54				42	32

[1] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[2] Figures for cholera in the Philippine Islands are subject to correction.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24
Algeria:																		
Algiers	C					2												
Bone	C			1														
Philippeville	C				1			1	1									
	D				1			1										
Argentina: San Juan Province	C				P													
Belgian Congo	C			1														
	D			1														
British East Africa (see also table below):																		
Tanganyika	C	18	46	17	6			8										
	D	21	30	10	6			2										
Uganda	C	35	138	298	418	71	93	69	52	59								
	D	32	126	286	400	71	93	68	49	61								
Ceylon: Colombo	C	4	3	2	1	4	1	1			1	1	1		1	2		
	D	3	3	2	1	4	1	1			1	1	1		1	1		
Plague-infected rats		1	5			1	8	4										
China:[1] Amoy	C		1															
	D		1															
Dutch East Indies:																		
Batavia and West Java	C	74	59	116	75	12	11	20	15	19								
	D	71	59	66	75	12	11	20	15	19								
East Java and Madura	C	1	1															
	D	1	1															
Java and Madura	D	243	176	192	212	38	53	67	47	58	68	51						
Egypt:																		
Alexandria	C			4	13	4	3	1	1	2	2		1	1				1
	D			4	5	1	2			1	1							
Assiout	C	32	18	11														
	D	17	7	1														
Beni-Suef	C	12	5															
	D	3	3															
Beheira	C					1		1			2							
Dakahlia	C				1		2											
Deirout	C	3	10	3														
	D	1	4	1														

Gharbieh	C			1														
	D			1														
Girga	C	44	7		1													
	D	22	2															
Kena	C	3	1															
	D	1	1															
Minieh	C	1	6	3	12													
	D		3	1	4													1
Port Said	C			3	5	2												
	D		1	2	1													
Tanta	C							2			1		1					
Hawaii Territory:																		
Hawaii—Hamakua—Plague-infected rats			1					1										
Maui Island—																		
Haliimaile—Plague-infected rats													1					
Kula District	C						1											
	D						1											
Makawao—Plague-infected rats													1					
Paia—Plague-infected rats[2]														1				
India	C	6,142	752	88	221	164	175	130	215	282								
	D	5,199	692	51	128	94	117	92	137	146								
Bassein	C	1	1		4		1		1		1	2	1	1				
	D	1	1		3		1		1		1	2	1	1				
Bombay	C	11	8		12											1		
	D	11	6		6											1		
Plague-infected rats		137	94	37	48	8	13	17	9	23	17	7	10	9	9	12		
Burma	C				16													
	D				10													
Calcutta	C	2																
	D	2																
Madras Presidency	C	3	2	6	21					9	75	39				3		
	D	2	1	1	9					4	51	20				1		
Moulmein	C				9					P	5							
	D				1						4	3	2	2				
Rangoon	C	1	2	1	2	1				2	1							
	D	1	2	1	1	1				1	1							
Plague-infected rats		4	7	3	6	1		1	1	1	1	1	1	1	1	1		
Indo-China (see also table below): Pnompenh	C			3														
	D	4		2														
Iraq:																		
Baghdad	C	23	23	23	3			1			2	1						
	D	8	9	9	2						1							
Maudhan	C		3															
Madagascar (see also table below): Tamatave	C					1						2		1				
Morocco	C													10				

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April. On September 19, 1931, 18 deaths were reported in Changchuanpu and new cases in Kaitung and Fengtien. On October 17, 1931, plague epidemic was reported in western Shansi Province, with 2,000 deaths at Hsinghsien.

[2] The report of 1 case of plague at Paia for the week ended September 26, 1931, published in Public Health Reports for October 30, 1931 (p. 2651), was an error. This should have been recorded as 1 plague-infected rat.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24
Nigeria: Lagos	C	5																
	D	5																
Plague-infected rats		6																
Peru (see table below).																		
Senegal (see table below).																		
Siam	C	1	2	1											1	1		
	D	1	2	1											1			
Spain: Hospitalet—Barcelona Province	C								5	1			1	1	1			
	D								2				1		1			
Syria: Beirut	C				2			1				1			2			
Tunisia: Tunis	C	16	16	11												1		
	D	8	3	1														
Union of South Africa:																		
Cape Province	C	3																
	D	3																
Plague-infected rats								1										
Orange Free State	C	2	2															
	D	2	2															

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
British East Africa (see also table above):							
Kenya	C	345	245	154	484	211	10
Indo-China (see also table above)	C	11		2	1		1
	D	2		2	1		
Madagascar (see also table above):							
Ambositra Province	C	30	19	15	1		
	D	29	18	15	1		
Antsirabe Province	C	48	7	12	13		
	D	47	7	12	12		
Miarinarivo Province	C	6	2		8		
	D	6	2		7		
Moramanga Province	C		2	1	1		
	D		2				
Tananarive Province	C	41	18	10	5		
	D	40	18	9	5		

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Peru	C	8	2	5	2		
	D	1		1			
Senegal:							
Baol [1]	C		4		27	101	13
	D		3		13	58	8
Dakar [1]	C	2	63	64	95	194	38
	D	1	49	56	73	106	24
Diourbel [1]	C						9
	D						3
Louga [1]	C	1	5	4	3	2	4
	D		2	2	1	1	1
Rufisque [1]	C		1	2	34	2	1
Thies [1]	C			12	16	26	12
	D			3	7	16	8
Tivaouane [1]	C	4	19	3	3		
	D		11	2	2		

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931 1	8	15	22	29	September, 1931, 5	12	19	26	October, 1931 3	10	17
Algeria:																	
Algiers	C	2	1	8	1												
Constantine	C		1		1						1						
Belgian Congo	C		47	42													
Bolivia.[1]																	
Brazil: Porto Alegre (alastrim)	C	53	19	5	41	11	6	17		7	13	12					
	D				1	1				2		2					
British East Africa: Tanganyika	C		13	7	149	1	18			31							
	D				17												
British South Africa:																	
Northern Rhodesia	C				21			26									
Southern Rhodesia	C			1	2						1						
Canada:																	
Alberta	C				1		1							12			
British Columbia	C				2	2			3		1	1					
Manitoba	C			4									1				
Winnipeg	C											1					
Nova Scotia	C	1															
Ontario	C	9	17	32	35	1		2	2	4		2		5	2		9
Kingston	C	5									1						
Ottawa	C			1								1		5	2		1
Sault Ste. Marie	C	4	1														
Toronto	C	4	1	1													
Quebec	C				1												
Saskatchewan	C	46	48	54	42		10	6	10	8	8	12	5	1	6	3	1
Regina	C	2	2											1			
Chile:																	
Antofagasta	C				1												
Chanaral	C		1														
China:																	
Amoy	C	2	6	4	2	1						1		1			
	D	1	3	3	2	1						1		1			
Canton	C	4	3	1	2					1							
Foochow	C	P	P	P	P		P		P		P		P				
Hankow	C	3	5	4	3	1		1	1								
Hong Kong	C	3	1														
	D	1	2														

Manchuria—																	
Harbin (see also table below)	C		3														
Kwantung—Dairen	C	2	2	1													
Nanking	C	P	P				1										
Shanghai—																	
Foreigners only	C	17	7	11	3									1		1	
Including natives	D	18	7	13	6				1	1			1				
Swatow	D	2															
Tientsin	C		2		3												
Chosen (see table below).																	
Colombia:																	
Cali	D		1														
Santa Marta	D											1					
Dutch East Indies:																	
Batavia and West Java	C		2														
East Java and Madura	C		1														
Eritrea	C		3		2					10							
	D									2							
Finland	C	1															
France (see table below)																	
Great Britain:																	
England and Wales	C	744	570	287	187	26	25	19	21	33		19	45	45	41		
Bradford	C	6	8	5													
Leeds	C	2	2														
London	C	227	183	122	54	6	12	4	4	3	9	5	15	5	17		
London and Great Towns	C	558	403	228	152	22	20	17	10	13	30	11	34	35	31		
	D	2		1	1												
Sheffield	C	7										1	1				
Greece (see table below).																	
Honduras:																	
Puerto Castilla	C														1		
Tegucigalpa	C	1															
Tela	C	1															
India	C	14,265	11,403	7,313	5,359	978	904	645	400	481							
	D	2,923	1,849	1,704	1,352	234	213	179	120	144							
Bassein	C		1														
Bombay	C	8	9	6	6	1		1			1	2					
	D	5	4	5	6	1					1						
Calcutta	C	287	89	47	21	4	4		5	2	1	2		1			
	D	224	75	41	18		4		5	2	1	2		1			
Cochin	C	39	3				1	1	1					1	1	2	
Karachi	C	6		2		1											
	D			1													
Madras	C	19	8	2	2	1					1			1	5	6	
	D	5	6	1												2	
Negapatam	C	3		3	1		2			3		1			1		
Rangoon	C	11	13	6	3	2		1	1	1		1			2		
	D	1	5	2	1	1			1			1			1	1	
Vizagapatam	C	10	6	6	5		3		2	3	1	1	1	2	4		
	D	2	1	2	1		3		1	3	1	1	1				

[1] An epidemic of smallpox was reported on May 18 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931					September, 1931				October, 1931		
						1	8	15	22	29	5	12	19	26	3	10	17
India (French):																	
Chandernagor	C	10	7	1	3												
	D	7	5		2												
Karikal	C	4	4	6	4	1	1	3	2		2	5			5		
	D	3	4	6	4	1	1	2	2		2	1			1		
Pondicherry Province	C	6	11	7	28	11			3	1	6	1					
	D	9	11	7	28	11			3	1	6	1					
India (Portuguese)	C	21	3														
	D	6	1														
Indo-China (see also table below):																	
Pnompenh	C		1	2													
	D		1														
Saigon and Cholon	C	1	2		3	1	1			1		3	2	1	4	1	
	D	1	1		1	1				1		2		1	2		
Iraq:																	
Baghdad	C	2	3	1								1					
	D		2														
Basra	C		2	1													
Mosul Liwa	C				1				1					5			
Ivory Coast (see table below).																	
Japan: Nagoya	C				1												
Mexico (see also table below).																	
Jalisco (State)—Guadalajara	D	1	2	1	3			2						1	1	2	
Mexico City and surrounding territory	C	43	45	25	22	8	2			2	2	1		2			
	D	14	11	13	8	1	1					1	1	1			
Monterrey	C			1													
Torreon	C	1	1	3							1	1			1		
	D	2		2								1					
Vera Cruz	C	2	1														
Morocco (see table below).																	
Poland	C		3	3	18								1				
Portugal: Lisbon	C	56	67	48	45	17	12	8		10	21	18	17	16			
Rumania (see table below).																	
Siam	C	1	6	5	1							3					
	D		1	1	1												

Spain	C				7												
Straits Settlements	C	10	2				1										
	D	5	2														
Sudan (Anglo-Egyptian)	C	3	6	1								32					
	D		2									6					
Sudan (French) (see table below).																	
Syria (see table below).																	
Turkey (see table below).																	
Union of Socialist Soviet Republics (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P														
Natal	C								P			P					
Orange Free State	C	P	P	P	P			P	P	P	P						
Transvaal	C			P	P												
Upper Volta	C	3	88	12	2												
	D		1														
On vessel:																	
S. S. Clan McTavish at Manila from Chittagong	C	1															
S. S. Taif (pilgrim ship) at Saukin from Jeddah	C	1							1								
S. S. Talodi at Suakin	C		1														

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			August, 1931		
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31
Indo-China (see also table above)	C	168	264	142		17	41	30	16	1	1		7	29		
	D	35	82								1		4	11		
Ivory Coast	C															7
Sudan (French)	C		4													
Syria: Beirut	C								1							

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
China: Harbin (see also table above)	C			7		13	10	
Chosen	C	1		11		1	4	2
	D	1		3				1
France	C	4	16	15	6	54	9	20
Greece	C		4			3	1	
Mexico (see also table above)	D		3		1	1	2	
Morocco	C		4	6	7	49	48	23
Rumania	C			1		1		

Place		Jan., 1931	Feb., 1931	Mar., 1931	Apr., 1931	May, 1931	June, 1931	July, 1931
Turkey	C	63	37	1		9	1	
	D	7	6					
Union of Socialist Soviet Republics	C				1,516	1,345		
Territories in Asia	C	194	532					
Ukraine	C	44	23					
Other territories in Europe	C	806	1,577					
Railroads, etc	C	43	77					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	Week ended— July, 1931 4	11	18	25	August, 1931 1	8	15	22	29	September, 1931 5	12	19	26	October, 1931 3	10	17
Algeria:																				
Algiers	C	3	7	9			2													
Bone	C										1	1								
Constantine Department	C	9	22	26	2		1		1							2		1		
Oran	C	1	2	2						1				1						
Australia, Western	C	1	1																	
Bulgaria	C	30	16	30									1							
	D	3	4	6																
China:																				
Manchuria—Harbin	C	8		16																
Shanghai	C						1	2			1									
Tientsin	C	2																		
Chosen (see table below)																				
Colombia: Cali	D													1						
Czechoslovakia (see table below).																				
Egypt:																				
Alexandria	C	1		3											1	1				
Beheira Province	C	4																		
	D	2																		
Cairo	C												1							
Great Britain: Scotland—Fife County	C		1																	
Greece (see table below).																				
Guatemala (see table below)																				
Iraq: Baghdad	C		2																	
	D		2																	
Irish Free State.																				
Cork County—																				
Schull	C					1														
Skibbereen	C			2	1															
Kerry County—																				
Dingle	C		1																	
Listowel	C			1																
Kildare County—Naas	C																1			

Limerick County—																				
Croom	C																	1		
Glin	C														2					
Limerick	C				2				1											
Michelstown	C				1															
Rathkeale	C																	1		
Mayo County—																				
Belmullet	C		1																	
Castlebar	C											1								
Westport	C											1								
Japan	C			1																
Lithuania (see table below).																				
Mexico (see also table below):																				
Durango	D							1												
Mexico City, including municipalities in Federal District	C	170	75	46	28	9	7	9	7	6		5	5	1	2	2	4			
	D	56	33	19	4	3	2	3	5	3		2	1	1		2	2			
San Luis Potosi	C	3	2			1	3					1								
Torreon	C							1											1	
	D							1											1	
Morocco	C	13	42	101	37	20	24	21		2	1	5						1		
	D	1	4	6	4	4														
Palestine	C	5	4	5	2				3	3	1	4				4	4	1	1	2
Panama Canal Zone—Balboa	C		2																	
Poland	C	538	298	97	9	17	13	14	10	4	10	7	6	2	1	2	2	8		
	D	28	18	4	2	1	1	1	1		1							1		
Rumania	C	70	169	80	2	2	7		7	9	4	3		4	6					
	D	8	18	13	2	2	1			1		1								
Syria	C		4																	
Tunisia:																				
Sbeitla, vicinity of	C	12																		
Tunis	C	13	29	73	1			1					1		1	1				
	D		3	4																
Turkey (see table below).																				
Union of Socialist Soviet Republics (see table below).																				
Union of South Africa:																				
Cape Province	C	P	P	P	P	P	P	P		P	P	P	P	P	P					
Municipality of East London	C			1					1											
Natal	C	P	P	P			P	P		P										
Orange Free State	C	P	P	P	P	P	12	P												
Transvaal	C	P	P	P	P	P	P	P		P	P	P	P	P	P					
Yugoslavia (see table below).																				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Chosen: Seoul	C	3	4		6	1		
	D		1		1	1		
Czechoslovakia	C		5	11	2			
Greece	C	8	22	6	9	2	13	5
	D	1	3				2	
Guatemala	C				33	34	3	
	D				15	5		
Lithuania	C	99	34	10	13	8	2	
	D	3	5		2			
Mexico (see also table above)	D	238						
Turkey	C	15	32	13	11	9		
Union of Socialist Soviet Republics	C		1,513	1,324				
Yugoslavia	C	10	43	14	2	3	1	
	D	1	5					

YELLOW FEVER

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17
Brazil:																	
Alagoas State	C							1									
	D							1									
Ceara State	C	2	1	1					1								
	D	2	1						1								
Minas Geraes State	C	5	2														
	D	2	1														
Rio de Janeiro State	C		2														
Sergipe State	C			1													
British Cameroons: Mamfe	C		3	2													
	D		2														
Colombia—Magdalena Province—Near Cienaga	C				4												

Gold Coast:																	
Akuse	C				2												
	D				1												
Dagomba District	C					2											
Kete Krachi	C																1
Kintampo	C				1												
	D				1												
Oda	C												1				
	D												1				
Tamale	C				2									2			
	D				2									2			
Wale Wale	C					1											
	D					1											
Ivory Coast:																	
Bobo Dioulasso	C				1												
	D				1												
Grand Bassam	C					4							1				
	D					2							1				
Kong Circle	C				4												
Seguela	C								P								
Nigeria: Abakaliki	C							1									
	D							1									
Senegal:																	
Podor (Hinterland)	C								1								
	D								1								
St. Louis	C													1			
Thies	C													1			
	D													1			
Sudan (French)	C				4												
Togo: Seva	C												1				
Upper Volta:																	
Banfora	C				2									2			
	D				1									1			
Diarabakoko	C													2			
	D													1			
Ouagadougou	C								1					1			1

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HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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THE MOVEMENTS OF EPIDEMIC MENINGITIS, 1915-1930[1]

By A. W. HEDRICH, *Associate in Biostatistics, The Johns Hopkins University; Consultant in Vital Statistics and Epidemiology, United States Public Health Service*

Although infection with the meningococcus apparently becomes extremely widespread at times, the clinical disease is fairly rare. Even during the year 1929, representing the crest of an epidemic, there were reported in the United States scarcely 11,000 cases. Doubtless, less than one physician in thirteen diagnosed even a single case during the year.

The seriousness of the disease lies in its fatality, for about half the reported cases died. The 5,208 deaths from meningococcus meningitis[2] during 1929 (1) in the registration area were only about three thousand less than the average annual number of diphtheria deaths during recent years, and were practically equal to the average measles mortality. An epidemic of meningitis is, therefore, not a trivial matter.

Because epidemic meningitis is one of the less familiar diseases, a brief general review of its characteristics will not be out of place, particularly as some of these have an important bearing upon some of the striking epidemiologic effects which the disease shows.

Historical.—It is generally acknowledged that cerebro-spinal fever was first differentiated by Vieusseaux, at Geneva, in 1805.

The prevalence of meningitis from that date until about 1882 has been recorded in great detail by Hirsch (2), using as his sources the accounts in the medical literature. Bruce-Low (3) brought this record down to the English outbreak in the World War, about 1915, using mainly statistical sources. A concise general review is also given by Heiman & Feldstein (4).

In the United States, the disease was recognized in Medfield, Mass., in 1806, a year after its first record in Geneva. Its subsequent American history may be summarized as follows:

1806–1816. Epidemics in other North Atlantic States, in Canada, and possibly in the South and West.

[1] From the Office of Statistical Investigations, U. S. Public Health Service, and from the department of biostatistics, School of Hygiene & Public Health, The Johns Hopkins University, Baltimore, Md. (Department Paper No. 155.)

[2] The commoner synonyms are "epidemic meningitis" and "cerebrospinal fever." In this paper, "meningitis" will refer solely to the epidemic variety, excluding nonmeningococcal types.

1817–1841. Judged by the absence of medical references, this quarter-century was an interval of relative quiescence. Outbreaks were reported only from Middletown, Conn. (1823), and Trumbull, Ohio (1828).

1842–1850. Beginning with an outbreak in Rutherford, Tenn., in 1842, a succession of outbreaks were reported from various States along the Mississippi River; later from Ohio, Pennsylvania, and several small towns in Massachusetts.

1851–1855. No epidemics reported in the literature.

1856–1873. Mention of outbreaks in North Carolina and at three places in New York State in 1856, but epidemics became more frequent during the Civil War period (1861–1865). Both the Northern and Southern armies were affected, and many States, north and south. Reports continue from various places until 1873. In that year, Massachusetts was visited by a severe epidemic, "after an immunity of many years."

1874–1892. No American epidemics recorded during this 18-year period in the three reviews mentioned. In closing his record (publication date 1886), Hirsch wrote that, judging from the silence of American writers, "the disease would appear to have ended for the present on American soil." In the light of the more continuous records of recent times, it seems more likely that the disease merely declined to a low ebb.

1893–1915. The prevalence was relatively high in Chicago in 1891–1893. In the latter year, New York City also showed an excess; in 1897, Massachusetts; in 1899, Michigan. The first volume of United States Mortality Statistics, covering the years 1900–1904, shows pronounced excesses during 1900 in about half of the 10 original registration States. In 1904–1905, New York City experienced the most severe outbreak of her history. Indiana, Connecticut, and Maine showed excesses a year or two later.

During 1910, a severe epidemic is said to have visited the Pacific coast (4); in 1911–1913 the Southwestern States had an epidemic. The Texas outbreak has been described by Sophian (5). Some Northern States also showed excesses at this time. At about the end of this period the statistics of the present paper begin.

Etiology.—Epidemic meningitis is now generally attributed to the meningococcus. Credit is given to Weichselbaum for establishing the etiologic relationship in 1887. Considerable care and skill are required in the cultivation of the organism, which is, in general, quite fragile outside the human host. According to Rosenau (6) it dies rapidly on drying, does not long survive room temperature, is easily overgrown by other organisms, but is, curiously enough, more resistant to sunlight than most other pathogens. The earlier difficulties encountered in cultivating and identifying the organism account for

some of the numerous conflicts in the meningitis literature, e. g., as to the frequency and duration of the carrier state.

Gordon and others have identified four or more types of the meningococcus, but McCoy (7) says that, so far as we know, they have no reference to type of cases, clinically, or to epidemiology. Branham (10), in 1928, found a new form, *Neisseria flavescens*, in Chicago. Glover in England (8) and Branham et al (9) in this country, found that, during epidemics, the proportion of agglutinable types increases. The results of both groups of workers also suggest that the distribution of types may be different in successive epidemics. It is probably not yet known how the changes in type are related to the epidemic cycle, e. g., whether such a change usually precedes the approach to an epidemic.

Infection, attack, carrier state.—Vaughan says (11) "There can be no possible doubt that the meningococcus is carried into the body with the inspired air. There is doubt, however, whether this is the sole avenue of invasion. It must be admitted that it may reach its normal habitat in the naso-pharynx through the mouth in food or drink * * * from drinking cups, etc."

There is ample evidence to show that in the great majority of instances infection fails to go on to frank attack, or even to produce recognizable symptoms. The clinical disease results when the meninges are invaded. Apparently infection results in attack with much greater frequency among children than among adults; for the attack rate among children is higher than the adult rate, although adults are, during epidemics, found oftener to harbor the organism. In the English epidemic of 1915–16, for example, it was found that the proportion of infected persons among adults was usually two or three times as high as among children (13).

Some of the epidemiological riddles provided by meningitis began to clear up when Albrecht and Ghon, in 1901, found that healthy persons could become carriers of the meningococcus. Numerous workers[3] have subsequently confirmed this finding. Glover (12), for example, concluded that in military recruiting camps a proportion of carriers of 2 to 5 per cent of the camp strength must be regarded as normal. At times of intense crowding of such camps, when the disease became epidemic, the proportion of carriers rose above 70 per cent. The cases, he says, are merely the visible foam on top of the huge carrier wave. In American cantonments, also, during mobilization, carrier rates of around 35 per cent were, according to Rosenau (6), not uncommon.

---

[3] Frost, in 1912, prepared a summary of the results of twelve groups of observers who found carrier rates during epidemics varying from a low rate up to 70 per cent, depending upon degree of exposure to infection, and doubtless upon technique, phase of epidemic, season, and similar factors. These findings were abundantly confirmed during the World War.

In civilian communities, observed carrier rates have not been as high as in armies, but may, nevertheless, be surprisingly large, in view of the small numbers attacked clinically. Eighteen series of examinations were made in 1915–1917 (an epidemic period), mainly in London, among persons not known to have been exposed to meningitis cases. Of the 1,881 noncontacts cultured, 253, or 13.5 per cent, were found to harbor meningococci; one group, consisting of 100 healthy work people, revealed 37 per cent positives (3a).

If, in spite of technical laboratory difficulties, proportions of 35 to 70 per cent of the examined populations can be found to carry the meningococcus at one time, the conclusion is inescapable that during the course of a heavy epidemic, very considerable proportions of the population must eventually become infected with the meningococcus; indeed, under congested conditions, as in army camps, it seems likely that, during epidemics, practically the entire population may become infected once or oftener [4] with the meningococcus.

Newsholme has estimated (3d) that, in the London epidemic of 1915–1917, less than 1 per cent of the infected persons [5] contracted the disease. In the light of footnote 4, his estimate certainly does not seem too low, since the annual attack rate was less than 1.5 per 10,000 in a population, of which the overwhelming majority had probably been infected.

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[4] In the 1917 report to the Local Government Board of Great Britain, summarizing extensive researches on cerebrospinal fever, Eastwood states (3b):

"There is, I believe, general agreement on the following matters * * * :

"Carriers may retain the meningococci in their throats a long time, though not, as a rule, for more than two or three weeks."

In the introduction to the same report, Newsholme (3c) adds that this usual limit of two or three weeks has been confirmed repeatedly.

If a limit of, say, three weeks is taken as an average, the way is opened to the estimation of various interesting velocities, or time rates, of infection; for the carrier prevalence at any point of time becomes approximately equal to the sum of the persons infected during the preceding three weeks or so.

The series of 18 samples of noncontact civilians, referred to in the text, were examined over a period of two years (March, 1915, to February, 1917). The mean carrier prevalence, from the combined 18 samples, was 13.5 per cent of the examined persons; hence, in the light of the foregoing paragraph, the carrier production, or carrier incidence rate, probably averaged about 13.5 per cent of the population per three weeks of time. The mean rate of *infections* per time unit in the sampled populations would doubtless be somewhat higher, as some of the carriers will have been infected more than once during the three weeks. Therefore, even allowing for sampling bias (the sampled populations consisted largely of routine hospital out-patients, with some nonmeningitis in-patients, "healthy workpeople" and the like), and for other errors in the underlying assumptions, it still seems safe to infer, for the 2-year period, an average infection rate of more than one per person. Actually, the prevalence rate cited above leads to a calculated average of 4.7 infections per person during the two years. The proportion escaping infection entirely must be small (30).

The foregoing data refer to civil conditions; in army camps the estimated carrier production rates would, under the indicated assumptions, be considerably higher, and the chance of escaping infection correspondingly smaller.

[5] Newsholme's estimate referred to the ratio of the attack rate to the "carrier rate." Obviously, the carrier incidence (production) rate was meant, not the more common carrier prevalence rate.

TABLE 1.—*Cases of meningococcus meningitis; also carrier rates among the general population* [1] *and among contacts to cases. Ruhr district, 1907. (After Bruns and Hohn (14))*

Month	Cases of meningitis in Ruhr districts	Among "healthy persons" [1]			Among contacts to meningitis cases		
		Persons cultured	Carriers found		Persons cultured	Carriers found	
			Number	Percentage of examined population		Number	Percentage of examined population
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Total, six months	1,155	1,786	401	22.4	609	224	36.8
March	148	56	34	[2] 60.7	23	14	[2] 60.8
April	278	360	116	32.2	135	67	49.6
May	327	408	97	23.8	172	81	47.2
June	188	352	84	23.9	93	34	36.6
July	146	323	49	15.1	67	18	26.8
August	68	287	21	7.3	119	10	8.5

[1] The authors lead (p. 19) to the inference that these "healthy persons" had not been in contact with cases. The table is so interpreted by Heiman and Feldstein (p. 60) and by others. The nature of the examined population is inadequately described, however, and there is room for doubt. The table is quoted chiefly in order to emphasize the need of more observations of this sort.

Columns (3) to (5) relate to locally cultured samples. Samples sent by mail from near-by places were excluded, because of lower percentages of positives, presumably through delay in incubation.

[2] In March, the "healthy persons" group showed virtually as high a carrier rate (60.7 per cent) as the contacts to cases (60.8 per cent). This may be partly due to the small number of cultures in March among healthy persons, and especially among the contacts. Note that during the remaining months the contacts showed higher carrier rates than the general population.

Table 1 is a composite of the carrier rates found in 1907 by Bruns and Hohn (14) during an epidemic in the Ruhr district of Prussia. The table indicates that, both among contacts and non-contacts to cases, the carrier rate was much higher in the earlier stages of an epidemic than at the end. It suggests further that the carrier rates may be at their maximum more than a month before the attack rates reach their peak. The English Army statistics likewise suggest that the case epidemic is preceded by a carrier epidemic.[6] Glover (15) (16) maintains that when the carrier prevalence reaches 20 per cent, an epidemic is likely to result. Newsholme, on the other hand, felt that his studies were consistent with the view that "the case rate is not deducible from the carrier rate, and the occurrence of an epidemic can not be satisfactorily explained as being due to the latter. The percentage incidence of carriers * * * shows no correlation with the incidence in time of cases of cerebrospinal fever * * *" (3d).

Further information on this important subject is clearly needed, particularly continuous observations which take in periods before and after epidemics, as well as the outbreaks themselves.

[6] This interesting possibility finds a parallel in the case of some other diseases. Compare the epidemics of "diarrhea" which often precede water-borne epidemics. There is some evidence that in diphtheria epidemics, the carrier peak may come a week to two weeks before the cases reach their maximum (21).

TABLE 2.—*Meningococcus meningitis—Monthly case rates (calculated from reported cases) (annual basis) per 100,000 population, in 28 States,*[1] *1913–1931*

Year	Midyear population, in millions	January	February	March	April	May	June	July	August	September	October	November	December
1913	55.0	3.21	2.89	3.55	3.61	2.55	2.43	1.35	1.71	2.21	1.97	1.53	1.91
1914	55.9	1.77	2.15	3.05	2.48	2.34	2.16	1.60	1.37	1.57	1.56	1.37	1.90
1915	56.8	2.50	2.41	2.43	2.68	1.89	2.06	1.62	1.02	1.41	1.18	.71	1.16
1916	57.7	1.80	1.79	2.43	2.55	2.29	2.70	2.29	2.16	1.50	1.69	1.43	1.53
1917	58.6	2.57	4.18	7.27	8.02	8.64	7.12	4.66	3.12	3.01	2.67	3.65	7.58
1918	59.5	10.27	13.24	13.32	12.29	9.10	4.99	4.55	3.86	3.46	4.02	2.78	3.48
1919	60.4	3.51	4.58	3.72	3.87	3.45	2.54	2.92	2.18	2.12	2.48	2.50	2.59
1920	61.3	3.63	4.48	3.44	3.12	3.28	2.74	2.40	2.69	2.72	2.44	2.56	2.82
1921	62.5	2.92	3.25	3.46	2.37	2.00	2.26	2.65	2.90	2.37	2.35	2.26	2.15
1922	63.5	2.10	3.25	2.97	2.42	2.41	1.84	1.28	1.69	1.55	1.50	1.73	1.49
1923	64.6	2.35	2.40	3.12	2.56	2.33	2.00	1.70	1.88	1.68	1.90	1.92	1.42
1924	65.8	2.11	1.84	2.13	2.26	1.75	1.65	1.68	1.59	1.76	1.56	1.55	1.02
1925	66.8	1.99	1.85	2.10	2.40	1.87	1.60	1.53	1.50	1.77	1.20	1.20	2.64
1926	67.9	2.29	3.53	3.95	3.08	2.53	2.19	1.92	1.28	1.95	1.66	1.85	2.44
1927 [2]	66.4	4.13	4.10	4.40	4.95	4.02	4.05	3.12	2.91	2.91	2.68	3.24	3.51
1928 [2]	67.2	5.01	5.30	7.30	7.69	7.74	6.10	4.39	5.27	4.25	4.86	5.21	8.28
1929 [2]	70.0	12.53	13.70	15.59	16.54	15.96	11.15	7.65	5.62	5.47	5.95	6.50	8.73
1930 [2]	71.1	11.79	12.58	11.48	11.40	7.34	4.96	4.12	4.60	3.22	3.68	3.90	4.97
1931	73.3	7.02	6.54	7.44	7.64	5.44	3.67	2.92	2.91	------	------	------	------

[1] The States included, and their regions are as follows:
New England and Middle Atlantic: Massachusetts, Connecticut, New York, New Jersey.
North Central: Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, South Dakota, Nebraska, Kansas.
South Atlantic: Maryland, District of Columbia, Virginia, South Carolina.
South Central: Alabama, Oklahoma.
Mountain: Montana, Idaho, Wyoming, Arizona, Utah, Nevada.
Pacific: Washington, Oregon, California.
The rates were calculated from cases as reported by State health officers to the Public Health Service, and published currently in Public Health Reports, and as annual summaries published separately by the service.

[2] Data not available for the following States: For 1927 and 1928—Nevada, South Carolina, and Utah; for 1929—South Carolina; for 1930—Utah.

Case fatality.—Although, as we have seen, the ratio of cases to infections is very small, the clinical disease is a very serious matter. The case fatality, as measured by the ratio of deaths to *reported* cases was, during the recent epidemic, as follows in certain large cities: Chicago, 53 per cent; Detroit, 50 per cent; New York, 49 per cent; San Francisco, 76 per cent (27), (28), (29).

Accuracy of statistics.—In an investigation in Prussia, in 1923 and 1924, under the auspices of the League of Nations, Seligmann (17) found that some 5 to 10 per cent of the cases reported as cerebrospinal meningitis were not of meningococcal origin, and an additional 20 per cent were of doubtful origin. Among the misdiagnosed cases, the pneumococcus and the tubercle bacillus were found most often to be the infecting organism. Similar results were obtained in a Danish investigation. These results do not necessarily imply that the disease is over-reported by 30 per cent, for, as has been pointed out (18), there are certainly diagnostic errors in the opposite direction, and other sources of under-reporting, particularly among mild and abortive cases.[7]

[7] Mortality reports also are in an unsatisfactory state; the deaths attributed to meningitis were increased 15.6 per cent in 1918 by inquiries sent by the division of vital statistics of the Census Bureau to physicians who had made vague entries on death certificates (20).

In spite of these defects, meningitis statistics probably rank among the best of our routine communicable disease records. The disease is serious, and is, therefore, more likely to receive medical attention and to be reported than is the case with the majority of children's diseases. Moreover, even defective statistics can be very useful when used in bringing out relative differences, for example, in tracing epidemic movements, such as will next be examined.

TABLE 3.—*Meningococcus meningitis cases (reported) and case rates per 100,000 population by regions,[1] calendar years, 1915–1930*

Year	Pacific		Mountain		West North Central		East North Central		New England and Middle Atlantic		South Central		South Atlantic		Total	
	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate	Cases	Rate
1915	[1] 59	1.4	[1] 0	0	[1] 71	1.8	[1] 485	2.9	[1] 323	2.9	[1] 117	1.9	[1] 348	6.3	[1] 1,403	2.9
1916	78	1.5	22	1.2	11	1.8	477	2.9	741	2.9	100	1.6	216	3.9	1,748	2.6
1917	176	3.2	14	.7	577	8.1	1,308	7.8	1,969	6.8	157	2.0	504	9.0	4,705	6.4
1918	298	5.3	42	2.1	394	5.5	1,052	6.2	2,017	6.9	911	11.3	1,035	18.2	5,749	7.7
1919	148	2.7	18	1.7	165	2.4	486	2.8	1,132	3.9	236	3.1	232	4.0	2,417	3.3
1920	200	4.7	51	2.5	201	2.8	540	3.0	946	3.2	155	2.9	177	4.2	2,258	3.2
1921	194	3.3	30	1.4	207	2.8	481	2.6	934	3.1	73	1.4	30	1.6	2,002	2.8
1922	150	2.5	39	1.8	143	2.0	287	1.6	787	2.6	55	1.0	66	2.0	1,527	2.1
1923	147	2.3	32	1.5	191	1.5	256	1.5	570	2.7	163	1.2	147	1.4	1,506	1.8
1924	137	2.0	21	1.0	166	1.3	179	1.1	544	2.5	95	.7	81	.8	1,223	1.5
1925	257	3.7	21	1.0	152	1.2	136	.8	450	2.1	125	.9	112	1.1	1,253	1.5
1926	548	7.6	68	3.2	169	1.3	195	1.1	475	2.1	119	.9	126	1.2	1,700	2.0
1927	547	7.3	194	8.9	384	2.9	760	4.3	446	2.0	106	.8	117	1.1	2,554	2.9
1928	481	6.2	494	22.5	716	5.4	986	5.4	1,603	7.0	152	1.1	127	1.1	4,559	5.1
1929	1,108	13.9	448	20.3	1,207	9.1	2,776	15.1	1,796	7.7	457	3.2	297	2.6	8,089	8.9
1930	513	6.2	261	11.7	1,009	7.6	1,964	10.5	1,181	5.0	717	5.0	427	3.7	6,072	6.6

[1] For the years prior to 1923 there are gaps in the records of some States. In such instances, both cases and populations were omitted in calculating the regional rate. Data for the year 1915 were especially incomplete in this respect. The years 1917 and 1918, however, which are more important for the purposes of the text, have only one State missing, viz, New Jersey for 1917.

The States included in each region for the years 1923 et seq., and the aggregate populations as of July 1, 1930, based on the April, 1930, census are as follows (estimated populations were used for the earlier intercensal years):

Pacific: Washington, Oregon, California. Population, 8,251,000.
Mountain: Montana, Wyoming, Colorado, New Mexico. Population, 2,228,000.
West North Central: Minnesota, Iowa, Missouri,* North Dakota,* South Dakota, Nebraska,* Kansas. Population, 13,305,000.
East North Central: Indiana, Illinois, Michigan,* Wisconsin. Population, 18,676,000.
New England and Middle Atlantic: Maine, Vermont, Massachusetts, Connecticut, New York, New Jersey. Population, 23,757,000.
South Central: Alabama, Mississippi, Arkansas, Louisiana, Texas. Population, 14,473,000.
South Atlantic: Maryland, District of Columbia, West Virginia,* North Carolina,* Georgia,* Florida.* Population, 11,423,000.
Total population, 92,114,000.

NOTE.—(For reasons associated with tabulation details, the following States were included in the period prior to 1923, but not thereafter: Rhode Island, Pennsylvania, South Carolina, and Virginia.)
States marked with an asterisk were not included for the years prior to 1923.

The recent epidemic in the United States.—Reviews of the meningitis situation in this country were published by Sydenstricker (18) in 1928, and by Williams (19) in 1930. The upper portion of Figure 1 brings to date Sydenstricker's graph, showing the monthly attack rates since 1913, in a group of 28 States. (All sections of the United States are represented in this aggregate, but the North and West have heavier representation than the South, as is shown in the footnote to Table 2.) In this interesting picture we see—

(*a*) An unusually systematic "epidemic wave" with maxima in 1918 and 1929. The interval between these two peaks was 11 years.

The gradual and orderly rise and fall of this wave is brought out more emphatically when the curve is shown on an arithlog scale (lower portion of the figure), so that the proportional *rates* of increase and decrease are depicted, rather than arithmetic changes. From Table 3 it can easily be calculated that, for the United States, the annual increase of cases during the years of epidemic build-up, 1925–1929, varied from about 40 per cent per year to a maximum of 80 per cent—not a very rapid rate of growth. It will later be seen that this was partly due to the fact that the peaks in different regions came in three different calendar years, so that the rise and fall for the combined regions are somewhat gentler than for smaller areas.

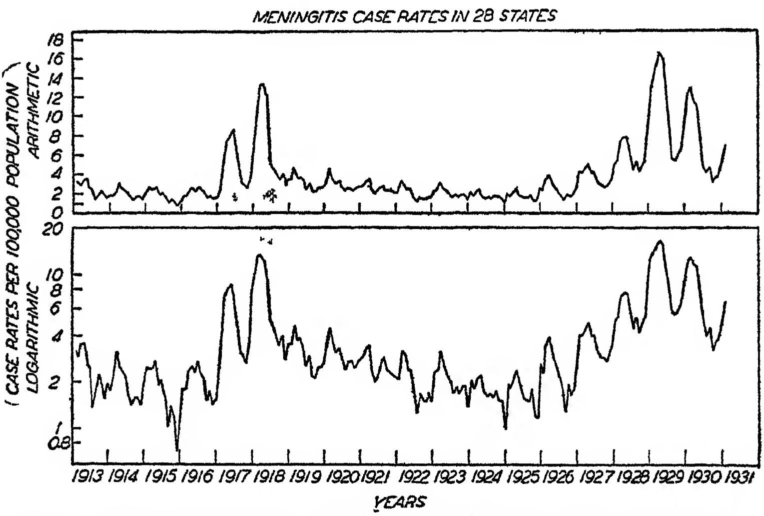

FIGURE 1—Monthly meningococcus meningitis case rates in 28 States, January, 1913, to January, 1931, inclusive, as reported to health departments. (Upper scale, arithmetic, lower scale, logarithmic)

The smooth and orderly rise and fall of the epidemic wave is in apparent contrast with the frequent impressions gained from the literature that meningitis is essentially erratic in its movements. Thus a reviewer writes in the Epidemiological Report of the League of Nations (22): "The fact which strikes one when examining these figures is their *irregularity and utter irrationality.*" Similarly, Geiger (22a) refers to the "piquant irregularity" of the disease. The basis of these impressions will be clearer later as we examine the statistics of other types of areas. We also see in Figure 1—

(*b*) An annual seasonal swing whose high points in this series always came after midwinter, oftenest in March or April, and whose low points came oftenest in October or November. On the arithmetic scale the seasonal swings are seen to increase in amplitude with rising epidemic wave, and the peak years stand out in bold relief;

but on the logarithmic scale the seasonal waves remain fairly constant with rising epidemic wave, and the peak year loses much of its distinctiveness, since it shows roughly the same proportionate annual rise as its predecessors on the upgrade of the epidemic wave.

The observed fact that the seasonal wave is much more constant on the ratio scale than on an arithmetic scale has important theoretical implications which will not be discussed at this time, except to point out (*i*) that when the epidemic wave doubles its height, the summer cases are approximately doubled as well as the winter cases, and (*ii*) that the annual round of climatic conditions seems to produce about the same *relative* swing in the meningitis incidence whether the epidemic wave is in a high or low phase. These same phenomena have been observed in the case of other diseases, but not so clearly as in the case of the meningitis series under discussion.

(*c*) Finally, it is clear from Figure 1 that attack rates, as indicated by reported cases, were somewhat higher in the 1929 epidemic than in 1918, but not strikingly higher.

Regional differences in the United States.—From the right-hand half of Figure 2[8] it is evident that the recent epidemic did not strike simultaneously in all sections of the United States. The earliest beginnings were first perceptible in 1925 or 1926 in the Far West. In the remaining sections, the first traces of a rise came one to three years later.

Epidemic crests were likewise passed earliest in the West. Although the upward movement apparently began earliest on the Pacific coast, the rise was sharper in the Mountain States, with the result that the latter reached their crest earliest, namely, in 1928; of the remaining sections, those in the North followed mainly in 1929. From this graph of the annual data it is not possible to say whether the crest was attained in the two southern groups, even in 1930. However, a more detailed analysis, based upon monthly data, suggests that in the South, as a whole, the crest was passed in the spring of 1930, although the situation in the spring of 1931 has been uncertain in some sections of the South.

Turning now to the left-hand portion of the graph, it is seen that, in the 1917–18 epidemic, the peak was first attained in the Northern Mississippi Valley and New England. The two southern sections followed about a year later. In the West the picture is rather confused, but a slight rise on the Pacific coast appears to have lagged somewhat, and to have come to a head during the second year, viz, 1918.

Collins (23) has shown that for influenza epidemics, likewise, the point of origin and direction of geographic movement has varied

[8] In order to eliminate the confusion due to seasonal swings, data in Figure 2 and Table 3 are shown by years instead of months.

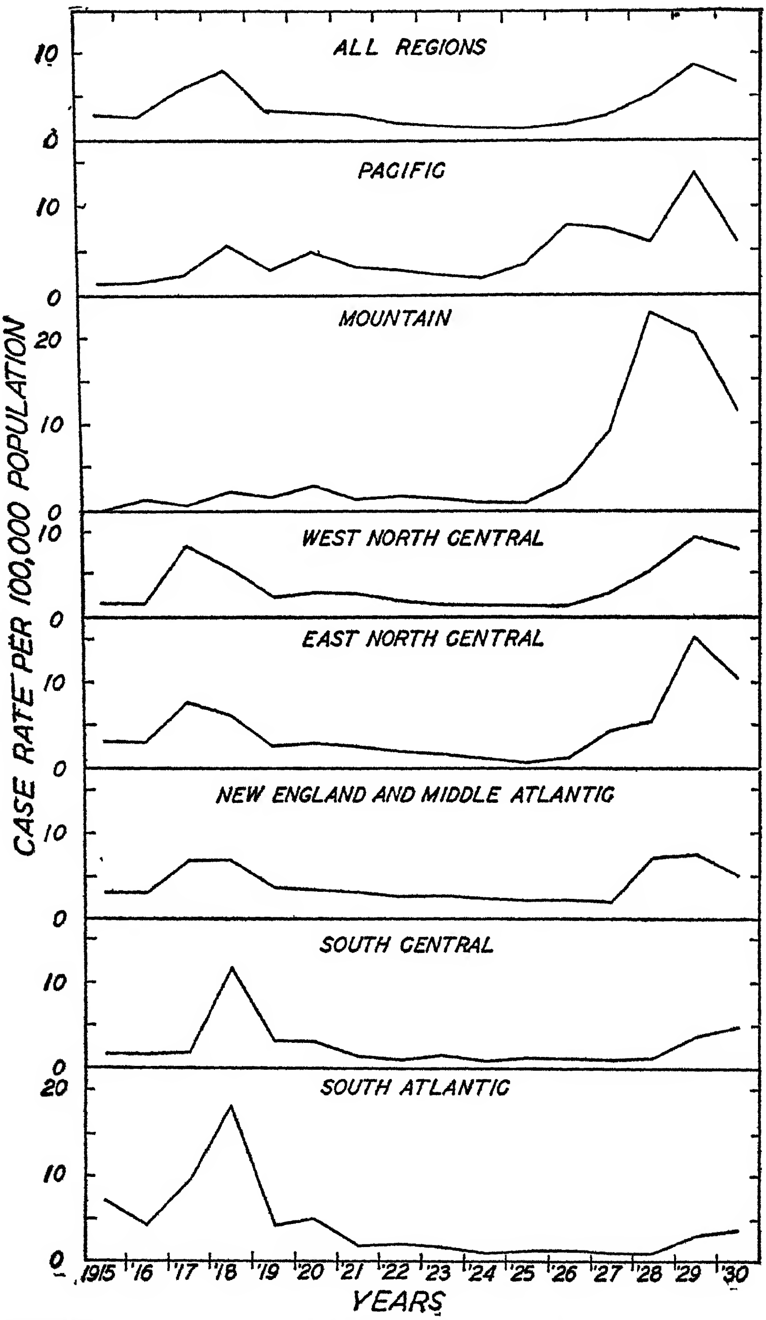

FIGURE 2.—Annual meningococcus meningitis case rates in the United States and in each of 7 regions, 1915–1930, as reported to health departments

from one epidemic to the next. For these two diseases, at least, no one section of the country can claim distinction as the "endemic source" of epidemics. It is not intended to imply, however, that in some instances the larger cities may not serve as foci for the surrounding areas.

A second point of decided interest in Figure 2 is that the southern regions, which had the highest attack rates in 1917–18 (due possibly to the large number of Army camps there) seem likely to have had the lowest rates in the epidemic just passing. Conversely, the Mountain region, which had scarcely a perceptible rise in 1918, has had the highest rates during the later epidemic.

Meningitis in foreign countries.—A detailed study of the statistics for earlier times and for other places will not be undertaken here. Nevertheless, as a safeguard against overinterpretation of the comparatively systematic pictures thus far seen it will be prudent to examine briefly into the experience of several other types of areas, including the available foreign material.

Although the published meningitis records of the League of Nations begin only with the year 1919, it is known that meningitis became epidemic in Europe shortly after the outbreak of the World War. In England, Germany, France (24), (25), (26), and probably in other European countries, the crest came in 1915; in Denmark it came a year later.

A graph for England and Wales in one of the Epidemiological Bulletins of the League of Nations (24) shows, after the 1915 crest, a secondary rise in 1917, and thereafter a gradual decline down to 1923; thereupon the rise began, which Table 4 shows to have continued in fairly regular fashion until 1930. There was, therefore, in England a period between peaks of 13 to 15 years.

TABLE 4.—*Annual cerebrospinal meningitis cases reported in various countries,*[1] *1919–1930*

Geographic division and country	Calendar year								Year ended June 30—			
	1919	1920	1921	1922	1923	1924	1925	1926	1926–27	1927–28	1928–29	1929–30
NORTH AMERICA												
Canada	(2)				[3] 82	[3] 182	[3] 167	[3] 206	[3] 210	[3] 223	[3] 224	[3] 196
United States [2a]	1,901	1,953	1,782	1,464	1,343	1,134	1,153	1,616	1,857	3,018	5,064	4,903
Mexico									[3] 30	[3] 18	[3] 140	[3] 324

[1] Data mostly from publications of the health organization of the League of Nations, Geneva, Switzerland: 1920–1925 from Statistics of Notifiable Diseases, Year 1925 (Epid. Intell. No. 10, p. 52); 1926–1930 from 1926 Annual Report, pp. 63–64, and from Mo. Epid. Report (R. E. 141) Aug. 15, 1930, p. 334. In a few cases it was necessary to take data from intermediate reports.

[2] In this table leaders imply "no data available."

[2a] Data from notifiable disease reports, U. S. Public Health Service, 30 States.

[3] Deaths.

TABLE 4.—*Annual cerebrospinal meningitis cases reported in various countries, 1919–1930*—Continued

Geographic division and country	Calendar year								Year ended June 30—			
	1919	1920	1921	1922	1923	1924	1925	1926	1926-27	1927-28	1928-29	1929-30
EASTERN EUROPE [4]												
Sweden	116	102	*120*	79	85	115	136	123	131	110	127	96
Scotland [5]	191	86	121	116	114	118	157	188	220	265	390	**400**
England and Wales	848	583	411	344	301	397	402	385	479	421	582	**624**
Denmark	[6] 227	[6] 144	[6] 92	[6] 84	[6] 87	[6] 107	[6] 139	[6] 129	127	92	91	93
Germany	[7] 422	------	696	**1,622**	1,149	742	750	746	780	846	*993*	769
Netherlands	122	133	120	132	111	106	115	93	103	113	123	**162**
Belgium	63	38	35	50	56	34	*62*	55	49	**73**	60	69
France	494	417	398	379	381	562	**653**	432	432	376	429	413
Switzerland	30	39	32	30	*69*	33	31	28	43	42	**79**	37
Austria	46	34	21	38	38	39	38	37	36	39	**44**	36
Italy	266	110	86	66	368	409	472	*582*	463	461	**754**	516
Portugal	------	------	------	------	------	------	------	------	------	208	213	211
WESTERN EUROPE												
Estonia	2	------	------	------	12	12	7	5	6	**47**	36	10
Latvia	------	------	------	------	19	20	34	15	36	70	**110**	106
Lithuania	------	------	------	------	13	15	14	16	10	31	13	[8] **50**
Poland	330	596	477	533	*597*	414	[9] 396	543	483	684	**800**	712
Czechoslovakia	67	75	80	*190*	142	145	154	*220*	181	184	**241**	171
Hungary	------	------	35	49	29	23	41	51	**58**	45	52	47
Greece	------	------	------	------	[10] *239*	155	153	136	205	109	184	**236**
Turkey	------	------	------	------	------	------	------	------	13	35	151	**214**
EASTERN AFRICA												
Algeria	39	25	31	61	*61*	38	51	32	23	20	52	**116**
Morocco	------	------	------	------	------	------	------	------	[11] 28	31	31	**65**
Nigeria	------	------	------	------	[3] 154	[3] 244	[4] **1,322**	[3] 931	90	13	45	54
Angola	------	------	------	------	------	------	------	------	[11] 3	**39**	8	[11] 2
WESTERN AFRICA												
Egypt	85	43	**43**	41	**44**	18	32	25	34	26	26	**63**
Anglo Egyptian Sudan	------	------	------	------	------	------	------	34	449	16	430	**1,276**
Uganda	------	------	------	[10] *677*	207	118	*298*	73	193	110	3	20
Kenya	------	------	------	------	------	41	30	26	10	43	**65**	39
Northern Rhodesia	------	------	------	------	------	0	1	6	6	28	60	**133**
Southern Rhodesia	------	------	------	------	------	4	5	4	7	20	**64**	50
U. of So. Africa	21	128	113	[11] 58	[12] 515	[12] *826*	[12] 552	389	297	[11] *978*	------	------
Madagascar	------	------	------	------	------	------	1	6	7	10	**30**	4
ASIA												
Korea	------	------	------	------	------	53	17	12	15	93	**140**	44
Shanghai [13]	------	------	------	------	0	[3] 2	[3] 4	[3] 2	[3] 8	[3] 18	[3] **368**	[3] 234
Japan	[14] *2,458*	951	772	935	708	**1,348**	447	407	384	320	306	303
Formosa	------	------	------	------	------	------	[10] *179*	96	36	13	46	11
Hong Kong	[14] *209*	158	125	53	*107*	81	77	14	15	32	26	16
Indo-China	------	------	------	------	------	------	18	7	**89**	66	46	45
Java and Madura	------	------	------	------	------	21	11	11	8	1	4	**40**
Hawaii	------	------	------	------	------	------	------	------	15	44	**108**	[8] 62
AUSTRALASIA												
Australia	[14] *100*	100	80	69	61	73	**91**	73	78	51	*80*	67
New Zealand	[14] *96*	79	56	42	36	31	31	35	*41*	24	27	34

[3] Deaths.
[4] The geographic arrangement within groups is roughly from north to south.
[5] 16 towns.
[6] The reports from Denmark for specific years vary from one summary to the next, possibly due to revisions in diagnosis. In this table the latest available data are taken for each year.
[7] Refers to deaths. Datum from note in *Mitteilungen* (25).
[8] 11 months only.
[9] Including Department of Lodz, 1925 (*et seq. f*).
[10] Possibly epidemic maximum.
[11] Only one-half year.
[12] Years ending June 30.
[13] International settlement of Shanghai.
[14] Possibly not a peak. A chance reference suggests that Hong Kong suffered a heavy incidence in 1918.

TABLE 5.—*Annual number of cerebrospinal meningitis cases in European countries reporting since 1921* [1]

	1921	1922	1923	1924	1925	1926	1926–27	1927–28	1928–29	1929–30
14 countries	2,724	3,712	3,527	3,244	3,546	3,582	3,535	3,781	4,765	4,145
The same, after omitting Germany	2,028	2,090	2,378	2,502	2,796	2,836	2,805	2,935	3,772	3,376

[1] Data from Table 4: The last four years end on June 30, in order to utilize the latest available data for 1930 from the League of Nations.

In Table 4 the annual meningitis reports from various parts of the world have been brought together from the various summaries of the health organization of the League of Nations. The cases or deaths for peak years since the 1915–1919 outbreak are shown in bold-face type; secondary peaks are shown in italics.

It is quite evident from this table that the remainder of Europe did not synchronize perfectly with the wave in England and North America. Germany experienced a pronounced epidemic in 1922, and a number of countries showed minor peaks that year or the next. Then followed France (1925), Denmark (1925), and Sweden (1926). These increases occurred at a time when the United States and England were approaching their minima.

In spite of these exceptions, Europe as a whole tended to fall into step with the wave seen in the United States and England. If we aggregate the cases from countries which show continuous records since 1921, omitting only Germany, it will be seen that after that year there was, with possibly one minor exception, a steady, year-by-year increase, culminating in the 1928–29 climax. (Table 5.) A third of the European areas came to a peak in 1929, and another third followed a year later.

As to the remainder of the world,[9] although appreciable increases were reported about five years ago in African and Asiatic areas, notably Nigeria and Japan, it is clear from Table 4 that there was, in many places, a coordination with the movement in Europe and North America. Fully half of the reporting areas showed peaks in 1929 or 1930.

It is to be noted from Table 4 that, even in Germany and in the other countries which showed interpandemic increases, the movements were not outstandingly erratic, but usually showed rises and declines of moderate orderliness.

[9] Data from South America and India are too scanty to yield a judgment in this connection.

Contrasts between local areas.—In Figure 3 are shown annual meningitis mortality rates in New York City, Baltimore, and the State of Massachusetts.[10] A period of 50 years or more is covered.

From examination of the graphs for individual cities, it is evident that, although continuity of wave movements between epidemics is still traceable in a portion of the periods, there is a great variability in the magnitudes and patterns of the epidemic movements. The individual graphs are not as systematic and orderly in their movements as are the regional graphs of Figure 2. In New York City, for example, the first three epidemics are sharper and better defined than its own later increases, or those of the other two areas.

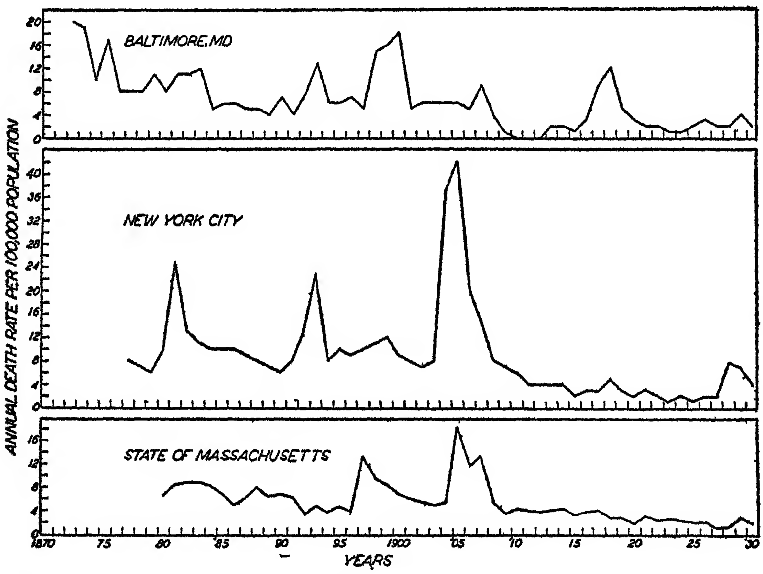

FIGURE 3.—Annual cerebrospinal fever death rates in Baltimore, New York City, and the State of Massachusetts, 1872–1930 (Massachusetts data include cerebrospinal fever and nonepidemic cerebrospinal meningitis. See footnote regarding sources)

It appears difficult to establish either the presence or absence of any significant synchronism in the meningitis experience of the three areas, notwithstanding that the maximum distance between these areas is less than 500 miles. It is striking that New York City, certainly a major hub of world contacts, after a huge epidemic in

[10] For the Massachusetts data it was found expedient to include deaths from epidemic and nonepidemic cerebrospinal fever Source State registration reports The years 1880–1920 were taken from an unpublished table in the epidemiology department of the School of Hygiene Data for 1929–30 were received by correspondence through the courtesy of F W. Cook, secretary of state

New York City data, 1870–1912, are from Heiman and Feldstein (4a), pp 52–53, later years from condensed annual report of the New York City Health Department, 1929

Baltimore data, 1872–1920, are from W T Howard, jr "Public health administration in Baltimore," Washington, Carnegie Inst., 1924, pp 418–428 Later data from annual reports of the Baltimore Health Department.

1904–5, participated in the last two pandemics with only the merest ripples in her meningitis curve. In Massachusetts it is difficult to find even the ripples. One gets the impression from such records that the presence and extent of a meningitis epidemic in any one city may depend more upon local conditions than upon interregional factors, such as imported infection. Dr. W. H. Frost makes the comment that, in this respect, the epidemiologic picture of meningitis resembles that of poliomyelitis.

The orderly, systematic waves for large areas must be thought of as composed of multitudes of smaller waves, the majority of which probably synchronize approximately with the major wave, but some of which are completely out of harmony. Moreover, since statistical composites are almost always smoother in their movements than their components, it should be borne in mind that the build-up and decline of the epidemic phase of a wave in a local area is usually considerably more abrupt than the rise and fall of the national wave. It follows from this that the meningitis incidence can better be forecast for large areas than for small.

Interval between epidemics.—No attempt will be made in this paper to analyze thoroughly the question of periodicity in meningitis, but it is obvious on casual inspection of the data which have been presented in this paper and elsewhere, that there is no clocklike regularity in the interepidemic period. The interval falls oftenest between about 6 and 12 years, but it is to be noted that Massachusetts and New York City have recently run 20 years, or more, between appreciable increases. It will further be recalled that in the historical review given earlier in this paper, there were indications of one quiescent period in the United States of nearly 25 years, and another of 18 years.

Meningitis must clearly be placed on the list of those diseases which have relatively long intervals between epidemics.

Acknowledgments.—The writer is indebted for criticism and suggestions to Dr. L. J. Reed and Dr. W. H. Frost, of the School of Hygiene and Public Health, and to Dr. Selwyn D. Collins, Dr. J. P. Leake, and Mr. Rollo Britten, of the Public Health Service. Acknowledgment is also made for tabulated material to Dr. W. C. Hassler, health officer of San Francisco; to Miss Ida May Stevens, assistant epidemiologist, California State Board of Health; to Dr. Arnold H. Kegel, health commissioner of Chicago; and to Dr. Shirley Wynne, health commissioner, and Dr. Charles Bolduan, director of education of the Department of Health of New York City; to Mr. F. W. Cook, Secretary of State of Massachusetts; and to Dr. T. F. Murphy, chief, and Mr. W. C. Smith, assistant chief, division of vital statistics, United States Census Bureau.

SUMMARY

This paper reviews some of the general epidemiological characteristics of epidemic meningitis, and the recent movements of the disease as to time and place.

1. The available evidence indicates that, during epidemics, surprisingly large proportions of the population may at one time or another become infected with the meningococcus. Under highly congested conditions, as in Army camps, it appears that practically the entire population may become infected once or oftener during epidemics. Probably far less than 1 per cent of such infections result in clinical attack, as annual attack rates in excess of 1 per thousand population are rare. The case fatality, however, is heavy; approximately half of the reported cases died during the recent epidemic, in spite of fairly widespread use of serum.

2. Meningitis became increasingly prevalent in Europe shortly after the opening of the World War, and in the United States shortly after her entry, when mobilization began. The highest attack rates in England came in 1915, and in the United States in 1918. In 1928–1930, the disease was again epidemic in most parts of the world.

3. The interval between the last two epidemic maxima was 11 years in the United States, and a few years longer in most European countries. The interepidemic interval is highly variable. It has oftenest been 6 to 12 years, but some areas have run as long as 25 years without epidemics. Massachusetts, for example, has had no appreciable epidemic since about 1905, and New York City only a minor one, namely, in 1928–1930.

4. Over broad areas, such as large groups of States, epidemics have appeared, not as sporadic explosions but as crests of rather smooth and systematic waves, the rising and declining phases of which have covered a period of three to six years or longer. Within smaller areas, such as individual cities, the movements of the disease have been less systematic.

5. Neither of the last two epidemics was synchronous in different parts of the United States, some regions having lagged two years behind others. The time rate of epidemic development within specific areas, and the rate of geographic movement are very much slower for meningitis than for influenza.

6. In the 1918 epidemic the reported attack rates were highest in the southern sections, probably due to the large number of military concentration camps; the Rocky Mountain States had the lowest rates. In the 1928 outbreak the Southern States had the lowest and the Mountain States the highest rates.

BIBLIOGRAPHY

(1) Deaths for 1929, by correspondence, from the division of vital statistics, U. S. Bureau of the Census. (Mort. Stat. 1928, Part I, p. 30.) Cases for the entire United States estimated from Table 3.
(2) Hirsch, A.: Handbook of geographical and historical pathology. London, 1886, pp. 549–564.
(3) Bruce-Low, R.: The prevalence of cerebrospinal meningitis throughout the world during recent years. Report on cerebrospinal fever. Local Govt. Board. London, 1916. New Series, No. 110, pp. 115–183.
(3a) Report on cerebrospinal fever. Local Govt. Board. London, 1917. New Series, No. 114. Introduction, p. ix.
(3b) *Ibid.*, Eastwood, A., p. 5.
(3c) *Ibid.*, Introduction, p. ii.
(3d) *Ibid.*, p. x.
(4) Heiman, H., and Feldstein, S.: Meningococcus meningitis. Philadelphia. Lippincott, 1913, pp. 5–10.
(4a) *Ibid.*, pp. 52–53.
(5) Sophian, A.: Epidemic cerebrospinal meningitis. St. Louis. C. V. Mosby & Co., 1913.
(6) Rosenau, M. J.: Preventive Medicine and Hygiene. pp. 252–56.
(7) McCoy, G. W.: Meningococcus meningitis * * * control. Pub. Health Rep., Vol. 44, No. 27 (July 5, 1929), p. 1596.
(8) Glover, J. A.: Jour. Hyg., XVII (Oct. 1918).
(9) Branham, Sara: Type distribution of meningococci in the United States during 1928 and 1929. Pub. Health Rep. (May 16, 1930), p. 1133.
(10) Branham, Sara: A new meningococcus-like organism from epidemic meningitis. Pub. Health Rep. (April 18, 1930), p. 845.
(11) Vaughan, V. C., *et al.*: Epidemiology and public health. 1922, Vol. I, p. 572.
(12) Glover, J. A.: Observations on the meningococcus carrier rate * * *. Report on cerebrospinal fever. Studies in bacteriology * * * military forces, 1915–1919. Med. Res. Council. London, 1920. (Special Report Series, No. 50.) p. 164.
(13) From report in reference (3a): C. J. Lewis, p. 198; D. Nabarro, p. 209; A. Eastwood, p. 7.
(14) Bruns, H., and Hohn, J.: Meningokokken im nasenrachenraum. Klin. Yahrb., Jena, XVIII (1908), pp. 285, 297, 299, 300.
(15) MacNalty, A. S.: Epidemic increases of the nervous system. London, 1927, p. 40.
(16) Glover, J. A.: Jour. Hyg. XVII (Oct., 1918). Graph of cases and carriers.
(17) Seligmann, E.: Cerebrospinal meningitis in Prussia in 1923–1924. Health Organization, League of Nations, C. H. 405 (Jan., 1926), pp. 7, 15.
(18) Sydenstricker, E.: (Unsigned report.) The rise in the meningitis rate. 1926–1928. Pub. Health Rep., Vol. 43, No. 39 (Sept., 1928), pp. 2519–25.
(19) Williams, R. C.: The prevalence * * * of meningitis in the United States. Pub. Health Rep., Vol. 45, No. 29 (July, 1930), p. 1657.
(20) Mortality Statistics. Bureau of the Census, 1928. Part II, p. 26.
(21) Keefer, F., Friedberg, S., and Aronson, J.: Jour. Am. Med. Assoc., Oct. 12, 1918. (Graph.)
(22) Epidemiological Bulletin, League of Nations. R. E. 141 (Aug. 15, 1930), p. 335.

(22a) Geiger, J. C.: Control measures * * * on ships. Am. Jour. Pub. Health XXI. No. 2 (Feb., 1931), p. 163.
(23) Collins, S. D.: Influenza-pneumonia * * * in 95 cities. 1920–29. Pub. Health Rep., Vol. 45, No. 8 (Feb. 21, 1930), pp. 21, 22.
(24) Epidemiological Bulletin. League of Nations, R. E. 114 (May 15, 1928), p. 193.
(25) Mitteilungen a. d. Reichsgesundheitsamte. Berlin. 1925, p. 122.
(26) Annuaire statistique de la ville de Paris. 1914–18. (Sections on cases treated in hospitals.)
(27) From cases and deaths for three year periods, by courtesy of the health officers of Chicago, New York, and San Francisco.
(28) Norton, J., and Gordon, J.: Meningococcus meningitis in Detroit in 1928–29. Jour. Prev. Med., Vol. 4, No. 3 (May, 1930), p. 214.
(29) Pope, A., and White, J.: An epidemiological and bacteriological study of epidemic meningitis in Chicago. Jour. Prev. Med., Vol. 3, No. 1 (Jan., 1929), pp. 63–76.
(30) Wilson, E. B.: Morbidity and the association of morbid conditions. Jour. Prev. Med., Vol. 4, No. 1, Jan., 1930, p. 28.

PERMANENT COMMITTEE OF THE INTERNATIONAL OFFICE OF PUBLIC HYGIENE [a]

Special Session of May, 1931

The Permanent Committee of the International Office of Public Hygiene held its special 1931 session from May 11 to 20 in Paris.

Those present were Messrs. Velghe (Belgium), president; Hamel (Germany); Araoz Alfaro (Argentine Republic); van Campenhout (Belgian Congo); A. Viel (Chile); Th. Madsen (Denmark); Shahin Pacha (Egypt); Hugh S. Cumming (United States of America); Barrère (France); Boyé (French Equatorial Africa); Gaston Joseph (French West Africa); Lasnet (French Indo-China); l'Herminier (Madagascar); G. S. Buchanan (Great Britain); J. D. Graham (British India); A. T. Stanton (British colonies and territories under the mandate of Great Britain); McCallum (Australia); H. B. Jeffs (Canada); S. P. James (New Zealand); P. G. Stock (Union of South Africa); Boyd Barrett (Irish Free State); A. Lutrario (Italy); M. Tsurumi (Japan); P. Schmol (Luxemburg); Colombani (Morocco); F. Roussel-Despierres (Monaco); K. W. Wefring (Norway); N. M. Josephus Jitta (Netherlands); W. de Vogel (Netherlands Indies); Mohsen Khan Rais (Persia); W. Chodzko (Poland); Ricardo Jorge (Portugal); J. Cantacuzène (Rumania); O. P. H. Atkey (Sudan); C. Kling (Sweden); L. Prochazka (Czechoslovakia); de Navailles (Tunis); Hussameddin (Turkey); Syssine (Union of Socialist Soviet Republics); José Scoseria (Uruguay); G. Yoannovitch (Yugoslavia); and Messrs. Abt, director of the International Office of Public Hygiene and Marianac, assistant director.

[a] Translation.

There were also present at certain of the meetings of the committee M. Roper, secretary general of the International Commission on Air Navigation, and Doctor Garsaux, medical expert of this commission.

I

The committee proceeded to the final draft of the convention project for the sanitary regulation of aerial navigation, the preparation of which it had been engaged in for several meetings.

The Commission on the Control of Aerial Navigation, established for this purpose, held in March, 1931, a meeting in order to examine the observations and proposals received from the governments to which had been submitted the tentative plan drawn up in May, 1930. Adherence to the basic principles of this preliminary draft having been general and the proposals formulated having been for the most part only on particular points, it seemed quite frequently possible to incorporate these propositions in a new edition slightly different in the aggregate from the first. On the other hand, the Yellow Fever Commission, according to its decision on this question, prepared a set of provisions relative to yellow fever to constitute a separate chapter in the future convention.

The new preliminary draft thus completed in detail having been promptly transmitted to the delegates, in case some suggestion might still be made by competent authorities of their respective countries, the commissions and later the committee in plenary session took up, examined, and finally adopted the terms, taking into account suggestions which had been under consideration. The committee took into consideration notably the opinions expressed at the conclusion of the Pan American Conference of the Directors of Public Health which had met a short time previously in Washington.

In spite of the diversity of the conditions existing in the different countries interested in the future convention, it seemed that, in their entirety, the provisions adopted—and which constitute the final project—correspond to the general needs essential to sanitary defense and, while not excluding any legitimate intervention in case of real danger, guarantee international air relations against any arbitrary action.

Confirmation in the form of a convention will be proposed to the governments through diplomatic channels, it being understood that each country will be free to define its position on the articles relative to yellow fever, the application of which it considers justified in its territory.

II

The committee has been kept informed of the progress realized, notably concerning the system of international communication of individual sanitary passports in case of sanitary surveillance (recently put into effect in the Belgian Congo) and the carrying out of the recommendations of article 49 of the international sanitary convention of 1926 on the subject of bills of health. In this regard, in consequence of steps undertaken some time ago with the assistance of the French Government, the putting into effect of agreements is expected (on July 1, 1931) between different countries for the abolition of consular visas; moreover, the conclusion of a convention has been prepared to facilitate the general acceptance of this abolition (or of the whole system of bills of health) in countries which could and would accept it.

The position of the committee remains unchanged as to the points with which, on several occasions, it had under consideration relative to the application of article 28 (periodic deratization of ships). In consideration of this, and through

the kind intervention of their respective delegates, several countries, such as the Argentine Republic and Turkey, although not yet having ratified the convention of 1926, have agreed from now on to draw up their regulations in accord with the provisions of this article. Similar steps are in progress in other countries. The notifications and publications relative to the ports designated by the governments for periodic deratization have been carried on by the Office, and new countries—Japan, Latvia, and French Indo-China—have adopted the international form indicated by the committee for the certificates (of deratization or exemption) issued in their ports.

Several countries, such as Great Britain, Australia, and France, have sent information concerning the status of deratization carried on and certificates of deratization or of exemption, respectively, issued in their ports. These are useful indications of appreciation of the system introduced by the convention of 1926 for extending the campaign against rats on shipboard—a system the first results of which seem more and more to confirm its value.

Information of this nature is included in the International Sanitary Maritime Annual, the 1930 editions of which (French and English) should soon be published, supplemented by documents sent to the office by a group of countries which have not before been represented here.

The question of international quarantine messages by wireless is, for the time being, to be left to the optional application of the system by means of mixed messages ("clear" or in code) until the adoption of an international code of signals.

As to the electric rat guards, their use was considered only under reservations, for it seemed to present difficulties such as those which arose in recent experiments carried on at Hull. The study of the possible perfecting of these guards should, doubtless, not be abandoned; but in any case the earlier conclusions of the committee hold good as to their merely accessory and relative value for the protection of the moorings by the means at present in use.

Several new points, directly related to the international sanitary convention, were submitted for the consideration of the committee which examined them in conjunction with its quarantine commission:

(*a*) A system of port-to-port notifications (also to foreign ports) of the cases of diseases reported on ships was organized in Great Britain, and the Office (which published in its February (1930) bulletin the description of this organization) should try to bring this into the most general possible use.

(*b*) The difference between the regulations of certain countries as to the conditions (especially the delay) required for validity of vaccination certificates presented by persons coming from countries where smallpox exists is a source of inconvenience. The committee proposes uniformity in these regulations on the following basis: Extending privileges to the persons in question if they can furnish a certificate of successful vaccination executed at least 12 days and not more than 3 years before the date of departure, or if they show scars proving that they have previously had smallpox.

(*c*) Difficulties also arise in connection with the requirement (in a limited number of countries) of antiplague vaccination. The committee, in the face of contradictory views expressed on the value of this vaccination, expressed the opinion that in any case its application should not yet be required in international relations.

(*d*) The stowing of cargoes of grain (especially of rice) coming from ports where plague is endemic very often makes a complete fumigation with full holds impossible. Consequently, it has been suggested that a uniform system of small passages, permitting access of the gas, be prescribed for this kind of cargo stowing, whether in bulk or in sacks. The committee did not consider this suggestion

possible of practical realization because of the serious objections of a nautical nature which it seemed to encounter. The advantages which it would afford, however, might be counterbalanced by the additional avenues it would create for the passage of rats.

(*e*) On the other hand, the committee has recognized the possibility and utility of granting a preliminary surface fumigation of cargoes of grain coming from ports where rat plague exists or is suspected. This entirely provisional measure is intended to limit the risk of introduction of plague-infected rats into warehouses by means of the modern methods of aspiration; it is not prescribed by the international sanitary convention (which requires, in all cases, a "complete" operation) and does not constitute a deratization in the sense and for the purposes of the convention. On the other hand, its object is the protection of the port itself, and the expenses should be borne by it.

(*f*) After a fumigation by hydrocyanic acid, the delay of 24 hours allowed by the international sanitary convention for the finishing of the deratization operations is sufficient in the sense that the work of unloading or loading may be continued on the ship, but an additional delay (an average of 6 hours) should still be allowed (as is already allowed in several ports without any objection being made on this score) before final authorization should be given for people to sleep or stay on board, especially when conditions of temperature and humidity are unfavorable for the complete evacuation of the toxic gas.

As questions bearing on the pilgrimage of Hedjaz are not customarily considered in the spring session of each year, when the pilgrimage is in progress, the special commission did not meet; but mention may be made of the two conferences held at the Ministry of Foreign Affairs of France, October 23, 1930, and May 15, 1931, to complete the work begun, on the proposal of the said commission and of the permanent committee of the Office, at Beirut in January, 1929. They were concerned with coordinating the sanitary protection of the pilgrims in the different countries that they cross in going to or returning from Mecca. A final agreement between the Governments of these countries has been prepared and will doubtless be concluded in the near future.

The committee heard a description of the quarantine provisions adopted at Suakin during the pilgrimage of 1930; the measures, followed for two years in the Sudan with regard to the pilgrimages, have already shown results. Preliminary information has been received, moreover, concerning the measures applied in Eritrea by the Italian Government for the sanitary protection of the pilgrims, as well as those followed in British India on the recommendation of the Haj Inquiry Committee.

The status of the question of sanitary and medical service on shipboard is at present as follows: In Turkey a regulation based on the sanitary law specifies the conditions placed by the State on the appointment of ships' doctors.[1] The Government of the Netherlands expressed its point of view. The provisions made in Great Britain to organize, with optional privilege, special complementary courses of instruction for ships' doctors, those expecting to be or already in the service, will be applied next July.

The system of international "commissions" has not yet been tested sufficiently to justify conclusions as to the results; it is to be given a new trial in the countries of South America. In several countries, however, opinion remains adverse not only to giving ships' doctors an official responsibility in quarantine matters, but to the institution of an official certificate of ability, mandatory for their nomination by the companies. Everywhere, however, it is recognized that the *authorized* opinions of the ships' doctors should be (and generally are) taken into consideration.

[1] See Bulletin of the International Office of Public Hygiene, v. XXIII, No. 6, June, 1931.

Indirect methods have been suggested for guaranteeing absolute respect for the regulations for the protection of the health of persons on board and those of the countries visited by the ship in the rare cases where this would be necessary. The expediency of a special detailed journal kept by the ship's doctor is also to be considered. But, especially, it is more and more apparent that it is to the general interest that, first, the quality as well as the professional ethics of the ships' doctors be brought to the highest possible level, so as to develop a really specialized corps, all of whose members shall be thoroughly competent to fulfill their mission, shall have a high sense of moral responsibility, and shall be able, in return, to hope for larger material advantages and greater stability.

This result may be attained either by insisting, in the general medical training, on the study of subjects indispensable for service on shipboard or by organizing complementary courses of study bearing on this essential knowledge and open to aspiring ships' doctors as well as (as a recruiting measure) to the physicians already in the service.

As to this last point, it is evident that the improvement in the material condition of doctors, especially on board ships other than those which carry numbers of wealthy passengers, would make available more applicants of better quality. But it is to be feared, perhaps, that present economic conditions will retard for some time such improvement and consequently delay correspondingly the solution of the entire question.

III

The committee, according to the provisions of article 3 of the convention, relative to antidiptheria serum, signed at Paris April 1, 1930,[2] designated the Serotherapeutic Institute, of Denmark, at Copenhagen to preserve the standard unit and to perform the related duties provided for by this article.

It has received notice of the new provisions made by different countries participating in the international agreement of Brussels of December 1, 1924,[3] for the application of this agreement.

A proposal was made to it, on the one hand, to strengthen the provisions concerning sailors (by compulsory declaration and treatment of those suffering from venereal diseases in the contagious stage), and, on the other hand, to provide for passengers of all classes (and especially certain categories of these) similar compulsory provisions. It has seemed to the committee practically impossible, under present conditions, to establish such a system internationally.

IV

The committee has received and approved the annual report of the health section of the League of Nations for the year 1930. It has, moreover, taken account of the resolutions adopted by the health committee of the League of Nations in its seventeenth session, held at Geneva from May 4 to 8, 1931.

It was informed by this committee of new questions in the execution of articles 8 and 10 of the opium convention of Geneva of 1925. After consultation with its special committee of experts on pharmacology and on the report of the Opium Commission, it gave its opinion, required by these articles, concerning (1) the list of preparations to which the Estonian Government demanded application of the exemption of control allowed by article 8; (2) the application of the provisions of the convention, according to the terms of article 10 to salt of acedicone and preparations which contain it. It has reserved temporarily its opinion as to preparations with a base of ipecopan, for which the application of article 8 was proposed and for which a new examination by experts is anticipated.

[2] See Bulletin of the International Office of Public Hygiene, v. XXIII, 1931, p. 183.
[3] Idem, v. XVIII, 1926, p. 1092.

V

Numerous communications were presented during the course of the session on the different subjects within the activities of the Office.

The study of a succession of plague epidemics, mild from 1924 to 1926 and more serious in 1927, 1928, and 1929, showed that a new focus of endemic plague exists in the northeastern part of Inner Mongolia. The reservoir of the virus seemed to be a spermophile, *Citellus mongolicus umbratus;* it was the only rodent which was found to be infected, and the seasonal incidence coincides with the issue of the spring generation of the spermophile. In 1929 the extension of the epidemic from the primary focus was caused by interhuman transmission. Likewise in Morocco, in Chaouia, the epidemic which prevailed from November, 1929, to June, 1930, had its origin in a rodent epizootic at Settat; but it was carried from this place to the surrounding regions by the natives coming to the town on business. In Senegal, plague occurred when after the cold season, fleas appeared in large numbers in the dwellings of the natives. It was proved that certain of these fleas were infected with plague. On the other hand, at that time very few plague-infected rats were discovered. In Egypt, in the villages where plague recurs almost every year, plague rats were looked for before the usual time of the outbreak of the epidemic, but none was found. Likewise cases of plague have been observed among the Bedouins living in tents on the sand where there are no rats. Although rats, domestic or wild, are still to be considered as a reservoir of the plague virus, proofs of the existence of other links in the propagation of the infection are multiplied. The origin of a small outbreak of pulmonary plague, observed in January, 1931, in Azeirbeidjan, has not been cleared up.

Inquiries as to the species of flea present in the Madras Presidency have been carried on in some 30 localities. They have shown that *Xenopsylla astia* is indigenous to south India; that *X. brasiliensis* has been established on the Mysore plateau and in the surrounding regions; and finally, that *X. cheopis* is of relatively recent introduction and is spreading, expecially by means of the transportation of grain and cotton. Epidemics of plague caused by *X. astia* are rare and mild; the seriousness of the epidemic is parallel with the number of *X. cheopis* present. Climate plays a part only because of the favorable conditions created for the multiplication of fleas. Some localities seem to be chosen spots for plague without having climates that are particularly favorable.

In Madagascar, from 1926 to 1930, the development of plague has followed superposed curves from year to year. It begins in August, toward the end of the cold season, which extends from May to September, inclusive, and reaches its maximum in December–January; the outbreak coincides with the period of the multiplication of fleas. There is a parallel between the curve of bubonic plague and that of pulmonary plague; but the proportion of pulmonary cases is notably higher in the cold months.

Antiplague serotherapy has given decidedly favorable results in British India. In a series of about 75 cases, of which about half were treated with serum, the mortality fell from 100 per cent to 27 per cent for cases with severe septicemia, from 50 per cent to 21 per cent for cases with light septicemia or without septicemia, and from 25 per cent to 0 for cases without bacteriological confirmation.

Antiplague vaccination was extensively practiced in Morocco during the course of the epidemic of Chaouia. Ordinary vaccine from the Pasteur Institute, vaccine of the bacillus of pseudotuberculosis of rodents, and lipovaccine were employed. There appeared to be no clear difference in efficacy between the three vaccines. The second seemed to be the most suitable because, while requiring only a single injection, it is less fatiguing for the physician to inject than the lipovaccine. This inconvenience of the lipovaccine, however, may now be partly eliminated by the use of a special syringe provided with a screw plunger. Im-

munity did not appear to be established until three weeks after vaccination. The results have been inconstant; side by side with examples showing individual or collective protection, there have been failures. In short, in Morocco, as in French West Africa, where in 1930 nearly 500,000 vaccinations were made, it was ascertained that vaccination en masse causes an epidemic to recede, but that it does not assure immunity to all the individuals vaccinated.

Along with countries where antiplague vaccination has been considered efficacious (in addition to the preceding, Egypt, India, and Italy), there are countries in which its value is doubted (Dutch East Indies, Japan, and Portugal). The Committee of the International Office of Public Hygiene has decided to collect definite information on the experience of the different countries in antiplague vaccination, including exact information on the type of vaccine employed, the number of injections, etc.

When several cases of plague appeared in the Algerian ports and at Marseille during the summer of 1930, the Office requested information on the results of the search for plague-infected rats in the Mediterranean ports. This investigation showed that the foci of rodent epizootics were much less numerous and much more discrete than was thought several years ago. In Algeria, 27 plague-infected rats were discovered at Algiers, 37 at Oran, and 4 at Mostaganem during the summer months and the beginning of the autumn of 1930; then the epizootics apparently died out. In Marseille, outside of one rather important focus discovered in October in a grain silo and quickly eliminated, only about 10 plague-infected rats were found during the summer; none after the end of October, 1930. In Egypt, in spite of the endemicity of human plague in several ports, only 4 plague-infected rats were found in Alexandria in 1930; none in the two preceding years. In Beirut, 4 plague-infected rats were found in 1930; none were found in Morocco, Tunisia, the Sudan, Palestine, Cyprus, Malta, Gibraltar, in the Russian ports of the Black Sea, at Istanbul, and at Lisbon.

The two strains of cholera vibrios isolated at the Tor quarantine station on the return of the 1930 pilgrimage and the discovery which among noncholera carriers had motivated quarantine measures have been studied in the Laboratory of Public Health at Cairo and at the Institute of Experimental Medicine at Bucharest. It was observed that they were agglutinated by the anticholera serum of the laboratory at Tor, and by another, but they were not by a series of serums from divers sources. It has been possible to establish that this peculiarity of the serum of Tor was due to the presence of group agglutinins and that these agglutinins were in relation to the receptors of the vibrios which are destroyed by heat at 100° C.; from whence the conclusion that it is necessary to employ for the identification of cholera vibrios, above all when the necessity of quarantine measures depends on it, an agglutinating serum and a technique of agglutination tests which eliminate those reactions not strictly specific.

The Committee of the International Health Office has intrusted to a commission the task of making a preliminary study of the preparation of a serum type destined to the various uses which are concerned with the identification of vibrios. The method of work will consist in the selection of well-known strains, the most part freshly isolated, studying their antigenic properties, then preparing a polyvalent serum which will be finally tried out and controlled in the countries where cholera exists.

The confusion really lies in the question of the relations between agglutinable vibrios and the nonagglutinable vibrios. In India certain investigators have observed the transformation of nonagglutinable vibrios into agglutinable, and vice versa, but these results have not been confirmed by other investigators. The commission has just been established by the Government of India for a period of five years with the object in view of studying, with the participation

of the Indian Research Association, the whole problem relating to the epidemiology of cholera.

As to healthy carriers of cholera vibrios, although it may be proved that, in certain circumstances, carriers may live in a locality without causing a single case of cholera, and whatever may be the diminution of the risk of contagion which can result from the presence of a bacteriophage among the carriers, these latter should none the less continue to be considered as a menace. Anticholera vaccination has, besides, no influence on the condition of the healthy carrier. One should then admit, from the point of view of quarantine measures, that it protects the vaccinated against an attack of acute cholera, and in consequence it notably diminishes the risk of importation of cholera, but it does not radically suppress it.

The committee of the Office, realizing that the primary question for the prophylaxis of yellow fever was the knowledge of endemic areas where the virus is preserved during the interval between epidemics, requested the cooperation of the Rockefeller Foundation in the organization of systematic inquiries in the suspected regions. The foundation responded favorably to this request and proposes that the existence of antibodies, evidence of a previous attack of yellow fever, be sought in the blood of groups of children aged less than 10 years in the localities capable of being permanent foci of the disease. It offers to train in its laboratories physicians from divers countries in the technique of study of these antibodies by the inoculation in the mouse of mixtures of serums with the yellow-fever virus and to continue examinations of this kind, up to a certain number, in its institutes at Lagos and New York. These studies, the obligation for which is inscribed in the project of the Sanitary Convention on Aerial Navigation, established by the committee of the Office, will comprise then at first the determination of an index of immunity in the suspected regions; then, once the existence is demonstrated, at a recent period, of yellow fever under the form of aborted cases, they will consist in careful surveillance of the zones thus delimited in the effort to uncover the disease. It has been called to the attention of the committee that lately, in Colombia, an infection which at first had been taken for influenza had been identified as yellow fever. In Brazil the activities of the sanitary services uncover from time to time a case of yellow fever in the interior of the State.

The projected studies have become realizable only since the possibility of substituting the mouse for the *rhesus* in the research on yellow-fever antibodies. The work of the Institute of Tropical Medicine at Amsterdam made a useful contribution to the perfection of these new methods.[4] They have clearly demonstrated, completing the work of Max Theiler, that the virulent products (blood, brain) injected in the cerebrum of the mouse provoke a fatal encephalomyelitis without apparent lesions of other organs; that the emulsion of the brain of the infected mouse can, after numerous passages, cause yellow fever in the monkey, even by the bite of the *Aëdes aegypti;* that the yellow-fever virus is present in the suspension of brain made in a 10 per cent peptonized and unsalted solution of rabbit serum, filtrated through a Seitz filter; that the addition to this filtrate of serum containing the antibodies protects the mouse in 96 per cent of cases when 75 per cent of the controls die.

An observation has been made at Amsterdam that the yellow-fever virus, having remained for a short time at 16° C., no longer causes yellow fever in the *rhesus* but immunizes the animal.[5] This opens up an avenue for the preparation of a vaccine.

Finally, it can be seen that as a consequence of inquiries for the discovery of subjects having an immunity, it may be possible some day to secure serums of recovered cases susceptible of use in the treatment of yellow fever.

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[4] For more detailed report see Public Health Reports for Oct. 2, 1931, pp. 2366–2371.—Ed.

[5] For more detailed report see p. 2739 of this issue of Public Health Reports.—Ed.

The commission on smallpox and antismallpox vaccination reported that the difference between variola major and variola minor, which it pointed out, is being accepted more and more. It has been accepted in Great Britain and the Belgian Congo. For several months variola minor has existed only in Great Britain; it has not seemed to invade new regions; Scotland and Ireland have remained free up to the present time. In the United States, where the number of cases of mild smallpox now exceeds 40,000 per year, there have been during the last 10 years small epidemics of virulent smallpox with a mortality from 2 to 33 per cent in some 20 States.

The use of the Leake method of vaccination, a multiple-pressure method, is spreading in the United States. In Great Britain two-thirds of the public vaccinators vaccinate with only a single linear scarification; the immunity acquired following this vaccination seems sufficient to protect contacts. An inquiry has been made of all the directors of the German vaccine institutes on the subject of the influence on the local and general reactions, as well as on the degree and duration of the immunity obtained, of the number and length of the vaccinal incisions. The conclusion of this investigation is that, in general, new research would be necessary in order to reply correctly to the questions asked; this will be undertaken at Munich and Schwerin. The general tendency is to state provisionally that, though one scarification may suffice, it is preferable to make at least two, and that the best length of the scarification is 0.5 centimeter. Finally, the German specialists think that, in view of the often unfavorable conditions under which vaccinations are carried out, it is to be recommended that the vaccine institutes supply the still active lymphs at dilutions of 1/5,000 to 1/10,000.

The method of purification of the antismallpox vaccine by adsorption on kaolin, elaborated in Japan, has not seemed, in Egypt, to be useful in practice at the present time, especially on account of the decrease in virulence and the short duration of conservation in a warm country. New experiments on vaccination, made in Japan on about 600 persons, have led to interesting observations on the use of subcutaneous injection. The advantages of the procedure would be more exact dosage of the vaccine, the insignificance of the local reaction, and even of the general reaction in the adult, and the absence of scar. Immunity, controlled by trial vaccination, seems to be obtained even when the reaction is absent. The application of this method is, however, only in the trial stage.

Postvaccinal encephalitis appears to be clearly on the wane in Great Britain, Germany, and Holland. Some infrequent cases only have been observed in Great Britain since the summer of 1930. In Germany, where each case reported is seen by a neurologist and then examined by a special commission, 9 cases, and 1 doubtful one, have been verified, as compared with 20 and 22 in the two former years; these figures are compared with the two million to two and a half million vaccinations per year. In Holland no new cases occurred since May, 1930, although about 25,000 vaccinations have been done. For the period 1924–1931 the average has been 1 case to 4,695 vaccinations and 1 death to 16,000 vaccinations; but among children under 2 years of age the rate is only 1 case to 25,000 vaccinations. As in England, the primary vaccinations at school age, which are manifestly the most dangerous, are much more rarely done than formerly. In the United States recognized cases were extremely rare before 1928; during the last three years the total is 40, of which 18 were in 1930. Five of these cases occurred simultaneously in one city, in children of about 6 years of age, vaccinated by a single scarification. One case had been reported in Turkey, at Istanbul, among a thousand vaccinations. Encephalitic syndromes following divers infectious diseases were observed among 30 cases in Great Britain in 1930. There were, moreover, reported cases of acute disseminated encephalomyelitis

which occurred spontaneously in 17 cases in Poland, the anatomopathologic lesions of which were not distinct from those of postvaccinal encephalitis.

While in France, North Africa, and the Iberian Peninsula, exanthematic fever, the type of which was established at Marseille, is to-day a well characterized and classified disease, the Italian clinicians are not inclined to classify with this type the analagous diseases observed in Italy, especially in the vicinity of Catania and at Rome. They tend to classify these rather with Brill's typhus. The disease is mild, seasonal, not contagious, and probably caused by the dog tick; but the eruption is more often macular than papular, and the Weil-Felix reaction, tested at the end of the febrile period or in convalescence, is generally positive. The principal objection to the identification with typhus is the absence of cross immunity, established by Burnet and Olmer, who state that, in Italy, the differences between the viruses are explained by the passage through different intermediary hosts. However, the observation may be made that these carriers are indifferent hosts, hardly likely to cause an adaptation of the virus. As to the Weil-Felix reaction, the different results in different exanthematic fevers are due perhaps to the use of different strains. It would be of value if the laboratories used uniform strains and the same technique.

Researches on the virus of Japanese fluvial fever, tsutsugamushi, showed corpuscles of the *Rickettsia* type, mostly intracellular, in the cutaneous lesions, the lymphatic glands, and the spleen of patients. These organisms, inoculated into the anterior chamber of the eye of the rabbit, multiply very rapidly, especially on the posterior surface of the cornea. They give rise to a well-defined condition, a severe iritis, and after cure cause a local immunity. With the same technique a culture is obtained of the *Rickettsia* of typhus exanthematicus. However, the incubation is shorter, the alterations of the small blood vessels are clearer, and the virus in the guinea pig becomes generalized in the organism. Moreover, the corpuscles are smaller and less numerous. The authors of these studies see here a proof favoring the hypothesis that the *Rickettsias* are the agent of typhus exanthematicus. There seems to be an analogy between the virus of the latter and that of fluvial fever.

Recurrent fever, the occurrence of which in the Union of Soviet Socialist Republics reached a rate of 51.2 per 10,000 in the period 1916–1922, decreased in 1930 to the rate of 0.1 per 10,000, and is no longer met with except in emigrants who move in the interior of the Union. The mortality is 4 to 5 per cent.

In the Sudan the epidemic which broke out with intensity in Darfur in 1926 was controlled immediately; but there remained carriers who presented no symptoms and whose blood contained spirochetes. It is probable that certain of these carriers moved into the Province of the Blue Nile, where immigrants come from the west for agricultural pursuits; they gave rise to an epidemic in 1930, especially in the vicinity of Gezirah. Some cases occurred in other Provinces, always in immigrants from the west. The conditions under which this moving population lives make the definite extinction of the disease slow of achievement. A typical case permitted the fixing of the duration of the incubation period of recurrent fever at 15 days.

Cerebrospinal meningitis has been increasing in frequency in the United States during the last three years, and in Egypt and Great Britain. It presents no parallelism with the epidemics of grippe in this latter country. In Turkey it was believed to have disappeared toward the end of 1930 in the region of Adana, after the epidemics of 1929 and 1930; but there was a recrudescence in the winter season of 1931. A new prophylactic method seemed to give good results in that region. It consisted in instilling, twice a day, in the nostrils of all the menaced population two or three drops of a 1/250 solution of trypaflavine.

Antimeningococcic serotherapy has registered failures in the United States where the mortality in certain groups reached 50 per cent. In other groups, however, the results were more favorable (mortality of 17.8 per cent, in 606 cases). In Great Britain the efficacy of the serum has not been very satisfactory except during the war. In Sweden a retrospective investigation on 3,000 cases is still in progress. In Yugoslavia the mortality in 1930 was 54 per cent. In Belgrade it was 30 per cent in 13 cases in 1929, and 40 per cent in 5 cases in 1930; but all the deaths were in children from 4 months to 10 years of age. Moreover, four children from 4 months to 4 years recovered. In Poland the results are reported to be very satisfactory. The sera, almost entirely polyvalent, are prepared with several strains belonging, according to the case, to one or several types of meningococci. The titer of the sera, estimated by the agglutination and deviation from the complement methods, was always above 1/200. It appears from information gathered by the Office that the efficacy of the serotherapy presents differences according to the country. The introduction into the preparation of sera of fresh and numerous strains is certainly a condition to success, but there seem to exist factors of efficacy which escape us.

The epidemiology of poliomyelitis presents difficulties. However generally accepted is the theory of communication of the disease by contact, it must be recognized that often no case occurs in the household of the patients, and that the existence of chronic carriers has not been proved experimentally.

In Yugoslavia all the cases reported in 1930 occurred in the outer edge of the country.

The Central Hygiene Council of Belgium has prepared instructions urging the medical corps to use more extensively vaccination against tuberculosis by the B.C.G., at the same time recommending the greatest care. In the United States, a study on vaccination by B.C.G. made in a limited group of infants will be carried on, trying to find for each infant vaccinated a suitable control. In Great Britain extended application of this mode of vaccination is not considered. They refer, on the one hand, to the experiments of Dreyer and Vollum, who conclude that there is a possibility of a revival of virulence by the culture of B.C.G. in a liquid medium, and those of St. Griffith, who considers as nil or weak the immunization obtained in the monkey, and, on the other hand, to the results of the same author and of Buxton, who have reported the absence of virulence in cows and the development of a notable resistance to test inoculation, especially after intravenous vaccination.

Two new occurrences, one in England and the other in the United States, which have showed that the possibility of a reappearance of psittacosis can not be disregarded, have led the committee of the Office to express the opinion that the removal of the prohibition of the importation of parrots should be decided on simultaneously in the different countries, and that the decision should not be made before the end of the year 1931. In the light of information collected, especially in Brazil, and the Argentine Republic, there will be considered in the next session of the committee the degree of danger and whether it would be possible to lessen it sufficiently by requiring adequate precautions during transportation on the part of importers.

Different reports have been brought to the committee on the practice of preventive medical examinations in the United States, Germany, Italy, France, Great Britain, Switzerland, and Turkey. In the United States the movement is extending to the policyholders in the life insurance companies, to the personnel of private enterprises, to the employees of certain public services, and to the private clientele of certain physicians. Statistics, based on the examination of 100,000 persons, have permitted the drawing up of curves for the frequency of different diseases according to age. The desire developed to introduce a quantita-

tive evaluation and, failing in that, an estimation of the degree of disturbance found on examination. Consideration is being given, however, to definite instructions and special training for the physicians in order to perfect and make uniform the technique of the examinations. In Germany the number of insurance companies grouped in the German Central for life insurance sanitary service is 25. The "Central" has concluded an agreement for examinations with the Syndicate of Leipzig, which includes the majority of German doctors. Any person insured for a minimum of 5,000 reichsmarks has the right to a free examination every 3 years; 28 per cent of those insured now use this privilege. No special document is issued after the examination, which is kept secret by the companies. This system is valued as much by those insured as by the companies. Publicity is given by a special journal, by quarterly pamphlets, by lectures, by films, and by radio broadcasting.

Recently the delegation of the Reich for the instruction of the people in matters of health prepared a health book, in which there is provided space for remarks on the periodical examinations. The fear was expressed in certain circles that this book might be demanded by the employers and be a cause of embarrassment to persons whose condition of health was not the best. In Italy the Instituto Nazionale delle Assicurazion has made arrangements with the National Syndicate of Fascist Doctors to offer free medical visits every two years to persons insured for 20,000 lira and more, consisting of urological tests and measurement of the blood pressure. It also provides free laboratory examinations (for example, glycemia, azotemia), climatic or thermomineral cures, and dental care. In France the movement for preventive examinations has had a different development. There is a center for examination and surveillance of children from birth to 14 years of age at the Winburn Foundation, at Courbevoie; the institution of the book of health and biennial examination of the students in the grammar schools of the Academy of Paris; the examination of all first-year voluntary students at the University of Strasburg; the creation of a medical center at the University of the City of Paris; periodic examination of the policyholders in the insurance company "Le Nord"; and the creation of a health society to procure for its members periodic examinations in the Department of the Aube. In Great Britain insurance companies grant reductions in rates to policyholders who submit to periodic examinations. In certain companies this provision affects 25 per cent of those insured. In Switzerland the company "Vita" procures for persons insured for more than 6,000 Swiss francs a free medical examination every three years. It grants the doctor 8 Swiss francs per examination. In 1929, 46.4 per cent of the policyholders benefited by these advantages. In Turkey free examinations, made by official physicians, have been instituted for different classes of persons—merchants selling drinks or foodstuffs, venders, officials, school children, infants, cooks, and domestics and persons who wish to marry. These examinations consider especially the discovery of tuberculosis, trachoma, venereal diseases, malaria, and ancylostomiasis, but include also the general capacity for work.

The final result aimed at by the preventive examinations will be the lowering of the death rate for all ages up to 50 years. Does the normal age of death, as defined by the highest mortality rate of a mortality table, vary according to countries, and has it been extended in relation to the general decrease in mortality? This question is going to be studied by the committee of the Office.

The measures taken in the Belgian Congo for the sanitary protection of the native workman have been submitted in detail to the committee. Different bodies are charged with studying periodically the possibilities of rational planning with regard to the native population, of controlling methods of recruiting, organizing recruiting, preparation, acclimatization, repatriation of the workers, and surveying the work with the employers. Three medical examinations

are regularly practiced—one at the time of recruiting, another at the time of arrival at the acclimatization camp, and another on arrival at the place of employment. At the acclimatization camp there have been instituted rational gymnastic exercises, the natives being, with the exception of the hunters and boatmen, stooped individuals with narrow chests. The creation of native cities in the working regions—cities in which the natives own the houses but not the ground—develops family life and the feeling of personal dignity. The former practice of giving presents to the chiefs is largely replaced by payments to the funds of the leaders, who buy agricultural implements, medicines, and establish dispensaries for sleeping sickness and native leprosariums. Insurance chests for those injured at work have been instituted, with a view of avoiding the squandering of indemnities granted by tribunals in reparation for accidents. Altogether, the mortality of the workers in the service of whites is about the same as in certain native villages. It decreases as the employment continues, because of adaptation. The birth rate reached 152 per 1,000 in the native city of the Mining Union at Elisabethville. If there is depopulation, the cause is attributed to the general breaking down of morals.

In France an appropriation of 10 per cent of all the colonial loans for sanitary services has just been made. Important resources are now going to be devoted to (1) the protection of the health of native workmen and (2) the demographic development of the populations furnishing the workers. The program consists particularly in the creation of a mobile, medical control of the workman; the verification of plans of sanitary and demographic protection, the establishment of which is compulsory before the opening of yards; the improvement of medical attention; the creation of a school for the recruiting of civil, colonial doctors, and similar activities.

The protection of maternity and infancy has made notable progress in French West Africa and in French Equatorial Africa, thanks to the institution of prenatal clinics, clinics for babies and children, to the care at childbirth, and to the increase in the number of European midwives, who serve as supervisors, and of native midwives in the colony, and especially to the native visiting nurses. Thus, in Ubangui-Chari the infant mortality, which was about 31 per cent, has fallen to 4 per cent in the radius of activity of the infant clinics. In the United States the Indian population lives under mediocre sanitary conditions, with small material resources, without individual hygiene, and in small and overcrowded dwellings. The mortality is twice as high as in the remainder of the population in the same region. There has been created for them a complete sanitary organization, with a large medical and nursing personnel, hospitals placed at the most accessible points in the reservations, asylums, a sanatorium, and a school medical service.

A comparison of the mortality rates by age groups and by causes of death in an urban and a rural population in France has shown that the higher total mortality rate in the rural population is due to the larger proportion of children and aged persons in this population. The mortality from the period from 20 to 39 years of age also presented a higher rate in the rural group, and this higher mortality appears attributable especially to tuberculosis and to diseases of the respiratory tract. The infant mortality from infectious diseases and from infantile diarrhea is twice as high as in the towns; and the rates of mortality in the towns from diseases of the heart, kidney, liver, and arteries largely exceed those from similar diseases in the country.

In Yugoslavia the mortality is lower in the prosperous towns than in the rural areas, where it is thought that there is reason for studying and combating the causes.

There is reported in the United States a constant increase in the need for hospital beds. There is a tendency to increase the number of persons to whom the

Federal Government assures hospital treatment. One of the main deficiencies in equipment is hospitals for tuberculous children.

Statistics of local administration recently required in England under the provisions of the law of 1929 [6] give the number of hospitals and beds organized by the local authorities (tuberculosis, acute infectious diseases, assistance to mothers and babies) and those which were administered before the new law by the authorities charged with the application of the poor law.

The study of the regulations which might be proposed for the transportation by sea of ferrosilicum is being continued; up to the present time 15 countries have made known their point of view. Experiments have been carried out in Holland for the detection in the atmosphere of toxic gases (phosphorated hydrogen, arsenicated hydrogen) by means of papers impregnated with silver nitrate or sublimate; the reactions were immediately positive in a boat loaded with ferrosilicum of dangerous composition. It seems that two precautions would be useful: (1) Not to accept the content of silicum reported as corresponding to the average composition of a lot, but to take it as of all the samples of the lot; (2) that the shipping of products of intermediate content, obtained when the mixture made in a furnace changes type, shall be prohibited.

Finally, the following reports have been made to the Office: On the organization in Canada of a system of clinics for diseases of the heart, and in particular for the surveillance of children inclined to rheumatic diseases in special clinics, on the one hand, and at home by a visiting nurse, on the other; on the results obtained in Great Britain with malaria therapy in 3,155 cases of general paralysis, of which 19 per cent were cured, and on the new methods bearing on this treatment; on the research and treatment of ancylostomiasis in the Rize district (southwest of the Caucasus) in Turkey and on the experience in the use of carbon tetrachloride; on the investigation and destruction (especially with the aid of *Gambusia*) of larvae of *Stegomyia* (carried on in 1929 in the U. S. S. R.) for the control of dengue in the region of Sukhoum at Batum; on the investigation which revealed in Mexico the existence of onchocerciasis, with ocular localization in about 20,000 persons, in the vicinity of the boundary of Guatemala, and on the organization of a suitable prophylactic service; on a series of cases of rabic paralysis, some serious, observed at the Antirabic Institute at Cairo and attributed to the probable action of a toxin; on the activities of the public health service of Egypt from 1923 to 1929, which have consisted in the creation of hospitals, laboratories, centers for the protection of the mother and child, of a nursing school, and in the organization of the fight against trachoma, bilharziasis, ancylostomiasis, the venereal diseases, tuberculosis, malaria, the communicable diseases, rats, flies, and mosquitoes.

INFLUENCE OF TEMPERATURE ON THE INFECTING POWER OF *Aëdes aegypti* CONTAINING THE YELLOW FEVER VIRUS

NOTE COMMUNICATED TO THE PERMANENT COMMITTEE OF THE INTERNATIONAL OFFICE OF PUBLIC HYGIENE, IN ITS SESSION OF MAY, 1931, BY DR. W. DE VOGEL, FORMER INSPECTOR IN CHIEF OF THE CIVIL MEDICAL SERVICE OF THE NETHERLANDS INDIES, DELEGATE FROM THE NETHERLANDS INDIES [a]

An interesting observation relative to the influence which temperature seems to have on the infecting power of the *Aëdes aegypti* containing the yellow fever virus, was given by Professor Schüffner during the September, 1930, session of the Royal Academy at Amsterdam.

[6] See Bulletin of the International Office of Public Hygiene, v. XXII, 1930, p. 239.

[a] Translation from the Bulletin Mensuel, Office International d'Hygiene publique, July, 1931, pp. 1216–1217.

Two groups of *Aedes aegypti*, from Habana, had imbibed the blood of a *rhesus* which was suffering the onset of an attack of yellow fever. After having been held for a month in a room (called "tropical") of the Laboratory of Tropical Hygiene of the Colonial Institute of Amsterdam, at a temperature of from 26° to 28° C. [78.8°–82.4° F.], mosquitoes from one of these groups showed themselves capable of transmitting yellow fever to a *rhesus*, killing the monkey in five days from the time of the bite. The animal showed all the symptoms of yellow fever.

The experimenter having been on leave for some time, the heating of the room was inadvertently neglected; the temperature was lowered to about 16° C. [60.8° F.] On his return he tried again to infect two healthy *rhesus*, each by a group of these same *Aedes aegypti*, which had been kept for the same time in the same room, thus under the same conditions of temperature.

Contrary to all expectation the two *rhesus* survived the infecting bites; these monkeys reacted only by a slight elevation of temperature. A month later they received an injection of virulent blood, taken from a *rhesus* infected with yellow fever; they showed themselves to be immune to the disease.

The temperature of the tropical room having been reestablished at 26° C. and kept for 20 days at that temperature, the bites of 4 *Aedes aegypti* belonging to the same group of mosquitoes caused the death of a *rhesus* in 7 days, with all the symptoms of yellow fever.

It is obviously important to carry on experiments on the immunizing property of "cold" mosquitoes.

Although the results of researches on the monkey can not be stated from the onset to be applicable to man, however more thorough investigations in this direction may well result in a method of efficient immunization against yellow fever.

Moreover, the observation may explain why yellow fever, introduced into a port of the temperate zone, spreads during the summer and disappears at the beginning of the cold season.

COURT DECISION RELATING TO PUBLIC HEALTH

Liability of city for negligent operation of incinerator.—(Florida Supreme Court; Chardkoff Junk Co. *v.* City of Tampa, 135 So. 457; decided July 21, 1931.) An action was brought against the city of Tampa for damages resulting from the destruction by fire of certain property of the plaintiff. It was alleged that the fire was caused by the city's operation of an incinerator for the burning of the refuse of the city. Respecting the question of whether the operation of an incinerator was a governmental or municipal function, the supreme court said:

It appears that the operation of an incinerator is not an exclusive governmental function, if it may be considered such in any event. The operation of the incinerator is for the specific benefit and advantage of the urban community embraced within the corporate boundaries. It is especially maintained to peculiarly promote the comfort, convenience, and welfare of the citizens of the municipality, and such benefits are not enjoyed by, nor do the results accomplished affect, the general public beyond the corporate limits.

With regard to the liability of a city to respond in damages because of the negligent operation of an incinerator, the holding of the court was "that a municipality may be held liable for damages occasioned by the negligent operation of its incinerator, whether it be alleged or not that the manner of operation constituted a public nuisance."

DEATHS DURING WEEK ENDED OCTOBER 24, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended October 24, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Oct. 24, 1931	Corresponding week, 1930
Policies in force	74, 520, 708	75, 394, 853
Number of death claims	12, 648	13, 092
Death claims per 1,000 policies in force, annual rate	8. 8	9. 1
Death claims per 1,000 policies, first 43 weeks of year, annual rate	9. 7	9. 6

Deaths [1] from all causes in certain large cities of the United States during the week ended October 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Oct. 24, 1931				Corresponding week, 1930		Death rate [2] for the first 43 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7, 407	10. 8	688	[4] 54	11. 1	738	11. 9	11. 9
Akron	31	6. 3	5	49	7. 8	8	7. 8	7. 9
Albany [5]	39	15. 7	1	20	10. 2	2	13. 9	14. 7
Atlanta	77	14. 5	7	72	16. 5	10	15. 0	15. 7
White	37		5	79		6		
Colored	40	(6)	2	57	(6)	4	(6)	(6)
Baltimore [5]	211	13. 5	26	88	12. 9	21	14. 3	13. 9
White	173		17	74		14		
Colored	38	(6)	9	141	(6)	7	(6)	(6)
Birmingham	67	13. 0	9	91	9. 8	4	13. 4	13. 6
White	34		4	69		0		
Colored	33	(6)	5	122	(6)	4	(6)	(6)
Boston	198	13. 1	26	74	13. 4	28	14. 2	14. 1
Bridgeport	27	9. 6	4	66	9. 2	1	11. 1	11. 0
Buffalo	135	12. 1	11	45	10 5	10	13. 0	12. 9
Cambridge	27	12. 3	4	80	11. 5	2	12. 1	11. 9

Footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended October 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Oct. 24, 1931				Corresponding week, 1930		Death rate for the first 43 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Camden	24	10.5	4	70	10.1	3	14.1	13.4
Canton	11	5.4	1	23	12.4	3	10.0	10.1
Chicago [5]	689	10.4	48	42	8.7	53	10.7	10.4
Cincinnati	123	14.0	16	96	11.3	16	16.0	15.5
Cleveland	184	10.5	23	67	8.7	17	11.2	11.1
Columbus	77	13.6	2	20	12.2	12	13.5	15.5
Dallas	49	9.4	8		11.7	2	11.1	11.3
White	36		7			1		
Colored	13	(6)	1		(6)	1	(6)	(6)
Dayton	47	11.8	9	126	10.3	4	11.9	10.7
Denver	68	12.2	7	68	13.2	6	13.9	14.8
Des Moines	27	9.7	5	88	10.6	3	11.1	11.7
Detroit	228	7.2	30	48	8.8	43	8.2	9.3
Duluth	14	7.2	1	25	13.4	3	11.2	11.3
El Paso	28	13.9	5		11.1	6	15.5	17.3
Erie	19	8.4	1	19	14.3	2	10.4	11.2
Fall River [5] [7]	17	7.7	3	68	7.2	0	11.1	11.8
Flint	26	8.3	6	77	7.3	4	6.9	9.2
Fort Worth	32	10.0	3		11.4	3	10.8	10.9
White	23		1			3		
Colored	9	(6)	2		(6)	0	(6)	(6)
Grand Rapids	29	8.8	3	44	9.2	5	9.1	10.2
Houston	53	8.9	5		11.1	9	11.0	12.1
White	38		5			5		
Colored	15	(6)	0		(6)	4	(6)	(6)
Indianapolis	97	13.7	8	66	11.3	10	13.8	14.6
White	84		7	66		6		
Colored	13	(6)	1	67	(6)	4	(6)	(6)
Jersey City	60	9.8	8	71	12.8	10	11.4	11.8
Kansas City, Kans.	27	11.5	3	62	9.8	4	12.6	11.8
White	19		3	74		4		
Colored	8	(6)	0	0	(6)	0	(6)	(6)
Kansas City, Mo.	91	11.6	8	61	12.7	8	13.1	13.2
Knoxville	18	8.6	1	21	11.3	1	12.3	13.7
White	16		1	24		1		
Colored	2	(6)	0	0	(6)	0	(6)	(6)
Long Beach	24	8.2	1	24	10.5	3	9.8	9.9
Los Angeles	278	10.6	21	61	10.2	18	10.7	11.0
Louisville	49	8.3	2	17	13.7	7	14.1	13.6
White	39		2	20		4		
Colored	10	(6)	0	0	(6)	3	(6)	(6)
Lowell [7]	23	11.9	3	76	14.0	3	12.8	13.4
Lynn	12	6.1	2	52	10.2	2	9.4	10.4
Memphis	84	16.9	12	127	14.4	11	16.6	17.0
White	44		7	117		5		
Colored	40	(6)	5	145	(6)	6	(6)	(6)
Miami	22	10.2	1	25	11.3	2	11.8	11.0
White	14		0	0		2		
Colored	8	(6)	1	88	(6)	0	(6)	(6)
Milwaukee	103	9.1	13	78	10.6	14	9.3	9.7
Minneapolis	96	10.6	12	77	11.7	10	11.2	10.7
Nashville	36	12.1	3	45	12.2	11	16.8	16.6
White	20		1	20		4		
Colored	16	(6)	2	118	(6)	7	(6)	(6)
New Bedford [7]	29	13.4	6	159	9.7	1	12.1	10.9
New Haven	37	11.9	4	76	9.6	3	12.4	12.7
New Orleans	121	13.5	5	27	15.6	13	16.8	17.4
White	74		1	8		5		
Colored	47	(6)	4	65	(6)	8	(6)	(6)
New York	1,294	9.5	86	36	10.3	120	11.1	10.8
Bronx Borough	191	7.5	2	5	6.8	14	8.2	7.9
Brooklyn Borough	442	8.8	35	37	10.0	52	10.3	9.9
Manhattan Borough	495	14.2	42	72	14.9	40	16.8	16.0
Queens Borough	133	6.0	7	19	7.2	11	7.2	7.1
Richmond Borough	33	10.5	0	0	12.8	3	13.7	14.3
Newark, N. J.	107	12.5	18	91	11.9	13	11.6	12.0
Oakland	52	9.3	5	64	11.1	2	10.5	10.9
Oklahoma City	29	7.7	4	55	10.6	3	10.8	10.8
Omaha	60	14.4	2	22	13.4	4	13.9	13.5
Paterson	24	9.0	1	17	12.8	3	13.2	12.2

Deaths from all causes in certain large cities of the United States during the week ended October 24, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Oct. 24, 1931				Corresponding week, 1930		Death rate for the first 43 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1931	1930
Peoria	31	14.9	4	105	10.4	2	12.6	12.2
Philadelphia	413	11.0	39	57	12.1	34	13.0	12.6
Pittsburgh	163	12.6	21	72	12.4	23	14.4	13.8
Portland, Oreg	79	13.4	1	12	13.4	7	11.6	12.1
Providence	44	9.0	5	46	10.1	1	12.7	12.9
Richmond	57	16.1	2	29	12.5	4	15.5	14.7
White	38		2	44		0		
Colored	19	(6)	0	0	(6)	4	(6)	(6)
Rochester	73	11.5	10	91	9.8	8	11.9	11.5
St. Louis	205	12.9	17	57	13.7	16	15.1	14.1
St. Paul	51	9.6	7	72	10.3	4	10.6	10.1
Salt Lake City [5]	37	13.5	5	74	17.0	5	12.2	12.3
San Antonio	57	12.4	9		11.4	7	14.3	16.3
San Diego	31	10.3	3	61	16.4	2	13.4	14.4
San Francisco	156	12.5	3	20	12.4	7	13.0	12.9
Schenectady	25	13.6	6	176	7.6	0	10.6	11.2
Seattle	78	10.9	3	28	10.1	7	11.3	10.8
Somerville	18	8.9	1	37	9.0	4	8.8	9.8
South Bend	13	6.3	1	25	7.9	4	8.0	8.8
Spokane	21	9.4	1	26	15.3	4	12.3	12.4
Springfield, Mass	31	10.6	0	0	10.7	1	11.7	12.2
Syracuse	43	10.5	5	59	13.4	5	11.6	11.6
Tacoma	19	9.2	2	51	14.1	2	12.1	12.5
Toledo	65	11.5	5	46	11.1	6	11.9	12.7
Trenton	32	13.5	4	70	16.0	4	16.4	16.7
Utica	33	16.8	1	26	16.9	2	14.1	14.8
Washington, D. C	172	18.2	17	94	14.4	12	15.8	15.0
White	109		9	74		1		
Colored	63	(6)	8	138	(6)	11	(6)	(6)
Waterbury	17	8.8	2	60	7.3	2	9.7	9.5
Wilmington, Del. [7]	25	12.2	3	65	13.7	2	13.9	14.4
Worcester	54	14.3	1	14	11.2	2	12.1	12.7
Yonkers	16	6.0	1	26	8.5	1	8.4	8.1
Youngstown	28	8.4	2	28	9.5	4	10.0	10.2

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentage of colored population in 1930 was as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 15; Fort Worth, 14; Houston, 22; Indianapolis, 12; Kansas City, Kans, 17; Knoxville, 16, Louisville, 15, Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 28; Richmond, 29; and Washington, D. C., 27.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

[These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers]

Reports for Weeks Ended October 31, 1931, and November 1, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 31, 1931, and November 1, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930
New England States:								
Maine	2	4	2	6	96	3	0	0
New Hampshire	6	2			1		0	0
Vermont	1	1				6	0	0
Massachusetts	52	76	8	2	59	93	2	0
Rhode Island	7	11			60		0	0
Connecticut	5	17	3	3	9	47	1	0
Middle Atlantic States:								
New York	72	78	[1] 20	[1] 7	87	93	7	11
New Jersey	27	66	8	6	19	48	1	1
Pennsylvania	111	100			126	126	5	5
East North Central States:								
Ohio	142	114	19	18	25	24	3	6
Indiana	109	36		7	20	24	2	2
Illinois	110	175	8	11	26	31	4	6
Michigan	67	68			42	54	3	6
Wisconsin	22	29	11	11	17	320	2	2
West North Central States:								
Minnesota	21	18	1		6	8	1	1
Iowa	27	10	2		3	1	3	0
Missouri	92	47	3		5	153	1	5
North Dakota	6	24				15	0	1
South Dakota	4	5			13		1	0
Nebraska	22	12			1	15	0	0
Kansas	54	1			18	40	1	23
South Atlantic States:								
Delaware	3	2				1	0	0
Maryland [2]	77	34	15	11	11	4	2	1
District of Columbia	11	4			2	3	0	2
West Virginia	91	34	18	29	57	23	0	0
North Carolina	214	107	4	11	96	5	3	0
South Carolina	60	60	322	449	13		0	0
Georgia [3]	51	39	21	68	3	6	1	1
Florida	26	33		3	27	7	0	0
East South Central States:								
Kentucky	170	35				47	2	2
Tennessee	166	45	27	31	6	9	0	1
Alabama [3]	121	114	12	19	6	21	1	4
Mississippi	106	72					0	1
West South Central States:								
Arkansas	62	18	2	44	2	1	0	0
Louisiana	43	26	8	6	6	3	0	1
Oklahoma [4]	147	65	14	31		10	0	1
Texas	35	42	10	14	14	13	0	1
Mountain States:								
Montana	1				18	3	0	0
Idaho	1				1	4	0	0
Wyoming	2			2			1	0
Colorado	1	8			1	29	0	0
New Mexico	22	9		2		8	0	2
Arizona	8	13	4	1		30	0	1
Utah [2]			2	3	3	1	0	2
Pacific States:								
Washington	3	33		3	30	8	0	2
Oregon	4	2	22	29	11	31	0	0
California	105	50	44	30	108	131	6	1

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 9 cases: 4 cases in Georgia and 5 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended October 31, 1931, and November 1, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930	Week ended Oct. 31, 1931	Week ended Nov. 1, 1930
New England States:								
Maine	7	11	15	19	0	0	5	6
New Hampshire	0	1	5	4	0	0	1	1
Vermont	6	2	6	3	14	0	0	0
Massachusetts	39	33	109	128	0	0	5	5
Rhode Island	3	0	14	7	0	0	0	4
Connecticut	12	4	38	18	0	0	2	2
Middle Atlantic States:								
New York	92	18	242	210	24	0	26	29
New Jersey	26	1	90	107	0	0	2	12
Pennsylvania	27	5	282	261	0	0	76	64
East North Central States:								
Ohio	10	98	445	460	3	15	66	50
Indiana	1	13	88	173	5	14	10	22
Illinois	37	17	214	301	18	27	27	16
Michigan	28	18	141	129	19	13	17	18
Wisconsin	21	13	52	90	4	1	4	15
West North Central States:								
Minnesota	30	45	35	33	4	2	2	5
Iowa	11	12	22	41	13	11	5	8
Missouri	3	9	86	77	3	15	19	17
North Dakota	1	3	13	17	0	25	1	6
South Dakota	1	9	9	5	5	20	1	3
Nebraska	1	12	11	25	4	12	1	5
Kansas	0	79	51	5	3	0	13	3
South Atlantic States:								
Delaware	0	0	14	12	0	0	4	4
Maryland [2]	1	3	90	48	0	0	50	31
District of Columbia	1	0	11	9	0	0	3	3
West Virginia	4	3	84	36	0	16	81	38
North Carolina	4	0	170	148	0	4	20	13
South Carolina	1	3	21	38	7	2	9	28
Georgia [3]	0	0	24	45	0	0	19	14
Florida	1	0	7	5	0	0	4	3
East South Central States:								
Kentucky	2	1	103	90	4	0	42	22
Tennessee	2	1	85	34	5	3	38	24
Alabama [3]	1	8	64	85	0	0	33	17
Mississippi	0	0	41	36	4	0	18	23
West South Central States:								
Arkansas	1	5	53	23	1	2	18	44
Louisiana	0	1	24	12	1	0	36	28
Oklahoma [4]	0	2	52	49	0	12	41	43
Texas	0	4	44	14	0	4	10	9
Mountain States:								
Montana	0	2	7	16	0	1	6	6
Idaho	0	1	5	9	0	0	1	1
Wyoming	0	1	3	2	0	0	0	1
Colorado	1	3	25	38	0	5	9	7
New Mexico	0	0	13	2	0	0	7	10
Arizona	1	0	7	3	1	3	5	7
Utah [2]	0	0	5	3	0	0	0	0
Pacific States:								
Washington	3	2	35	31	3	29	5	16
Oregon	0	1	29	16	11	0	6	1
California	2	61	134	73	8	16	18	13

[2] Week ended Friday.
[3] Typhus fever, 1931, 9 cases: 4 cases in Georgia and 5 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September, 1931										
Florida	--------	46	1	47	--------	3	5	17	0	23
Nevada	--------	--------	3	--------	1	--------	0	4	0	6
New Mexico	2	15	--------	31	4	3	3	8	0	28
New York	27	227	--------	8	233	--------	1, 763	463	1	204
Oklahoma [1]	1	205	39	189	3	30	1	83	18	202
Oregon	--------	8	48	6	25	--------	3	24	17	33
South Carolina	--------	171	512	1, 830	24	204	1	46	2	205
South Dakota	1	22	4	--------	15	--------	7	27	11	13
Texas	2	94	4	1, 150	--------	--------	3	93	--------	125
Virginia	2	360	635	51	94	21	14	219	5	253
Washington	7	30	17	--------	33	--------	22	126	26	31

[1] Exclusive of Oklahoma City and Tulsa.

September, 1931

	Cases
Anthrax:	
South Dakota	2
Chicken pox:	
Nevada	2
New Mexico	2
New York	163
Oklahoma [1]	13
Oregon	30
South Carolina	15
South Dakota	39
Virginia	29
Washington	78
Conjunctivitis:	
New Mexico	1
Dengue:	
South Carolina	20
Diarrhea:	
South Carolina	571
Virginia	913
Dysentery:	
New York	24
Oklahoma [1]	23
Oregon	13
Washington	8
German measles:	
New York	34
Washington	16
Hookworm disease:	
Oklahoma [1]	1
South Carolina	68
Impetigo contagiosa:	
Oklahoma [1]	1
Oregon	221
Washington	2
Lethargic encephalitis:	
New York	10
South Carolina	3
Texas	1
Washington	2
Mumps:	
New York	233
Oklahoma [1]	1
Oregon	29
South Carolina	21
South Dakota	28
Washington	20
Ophthalmia neonatorum:	
New York	7
South Carolina	8
Paratyphoid fever:	
New Mexico	1
New York	6
Oregon	1
South Carolina	6
Puerperal septicemia:	
New York	11
Washington	2
Rabies in animals:	
New York [2]	3
South Carolina	14
Scabies:	
Oregon	7
Washington	1
Septic sore throat:	
New Mexico	1
New York	14
Oklahoma [1]	21
Oregon	3
Tetanus:	
New York	7
South Carolina	4
Trachoma:	
New Mexico	1
New York	1
Oklahoma [1]	9
Oregon	2
South Dakota	35
Washington	2

[1] Exclusive of Oklahoma City and Tulsa.
[2] Exclusive of New York City.

Trichinosis:	Cases
New York	5
Tularaemia.	
Nevada	1
New Mexico	1
Oklahoma [1]	2
Virginia	1
Typhus fever:	
New York	1
Virginia	2
Undulant fever:	
New Mexico	1
New York	10
Oklahoma [1]	6
South Dakota	2
Virginia	3
Washington	3

Vincent's angina:	Cases
New York [2]	78
Oklahoma [1]	1
Oregon	14
Washington	1
Whooping cough:	
New Mexico	24
New York	1,562
Oklahoma [1]	19
Oregon	30
South Carolina	52
South Dakota	23
Virginia	415
Washington	181

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,370,000. The estimated population of the 90 cities reporting deaths is more than 31,825,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended October 24, 1931, and October 25, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	2,375	1,664	
97 cities	525	484	819
Measles:			
45 States	928	938	
97 cities	203	230	
Meningococcus meningitis:			
46 States	59	68	
97 cities	27	36	
Poliomyelitis:			
46 States	548	397	
Scarlet fever:			
46 States	2,870	2,495	
97 cities	810	756	688
Smallpox:			
46 States	138	249	
97 cities	14	15	6
Typhoid fever:			
46 States	885	739	
97 cities	143	109	94
Deaths reported			
Influenza and pneumonia:			
90 cities	446	550	
Smallpox:			
90 cities	0	0	

[1] Exclusive of Oklahoma City and Tulsa.
[2] Exclusive of New York City.

City reports for week ended October 24, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	1	0		1	1	0	3
New Hampshire:								
Concord	0	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Burlington	0	1	0		0	2	0	2
Massachusetts:								
Boston	9	21	24	6	0	3	9	4
Fall River	5	4	2		0	0	0	0
Springfield	3	4	1		0	1	3	1
Worcester	3	5	4		0	1	20	1
Rhode Island:								
Pawtucket	0	1	0		0	0	0	0
Providence	0	6	4		0	68	4	6
Connecticut:								
Bridgeport	1	4	1		0	0	0	1
Hartford	0	4	0		0	0	7	2
New Haven	1	0	0	3	0	1	1	3
MIDDLE ATLANTIC								
New York:								
Buffalo	3	11	9		0	1	1	10
New York	37	109	39	7	1	11	18	93
Rochester	1	3	0		0	5	2	5
Syracuse	9	2	0		0	1	0	3
New Jersey:								
Camden	2	6	4		0	0	1	3
Newark	5	13	2	6	2	0	1	3
Trenton	0	2	0		0	0	1	1
Pennsylvania:								
Philadelphia	15	47	8	3	1	7	6	27
Pittsburgh	9	18	9		0	18	14	29
Reading	1	1	1		0	0	0	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	1	10	8		0	2	0	8
Cleveland	16	35	4	7	2	4	26	13
Columbus	3	5	14		0	0	0	2
Toledo	17	8	1		0	1	0	6
Indiana:								
Fort Wayne	0	3	6		1	0	0	3
Indianapolis	1	12	2		0	4	8	4
South Bend		1						
Terre Haute	0	2	0		0	0	0	1
Illinois:								
Chicago	26	89	44	9	1	15	3	38
Springfield	0	0	2		0	0	0	0
Michigan:								
Detroit	11	55	32		1	2	3	10
Flint	2	3	4		0	0	2	0
Grand Rapids	1	2	0		0	0	1	0

City reports for week ended October 24, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	7	1	0		0	1	7	0
Madison	1	0	1			1	6	
Milwaukee	18	11	5		0	2	11	4
Racine	1	1	1		0	0	9	0
Superior	0	0	0		0	0	10	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	1	2	0		0	0	0	1
Minneapolis	25	27	10		1	1	12	8
St. Paul	11	9	2		0	0	0	3
Iowa:								
Davenport	13	1	4			0	0	
Des Moines	0	2	1			1	0	
Sioux City	0	2	7			0	1	
Waterloo	7	0	0			0	1	
Missouri:								
Kansas City	0	7	9		0	0	0	6
St. Joseph	0	1	10		0	0	0	3
St. Louis	3	36	24			1	0	2
North Dakota:								
Fargo	0	0	0		0	0	0	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	20	0	0			40	0	
Nebraska:								
Omaha	5	12	9		0	0	0	6
Kansas:								
Topeka	0	2	1		0	0	2	1
Wichita	0	2	4		0	1	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	1	1	2
Maryland:								
Baltimore	3	20	17	3	1	2	14	11
Cumberland	2	0	1		0	0	0	0
Frederick	0	1	0		0	0	0	0
District of Columbia:								
Washington	6	15	15	1	1	1	0	7
Virginia:								
Lynchburg	0	3	4		0	0	0	0
Norfolk	0	3	8		0	0	1	3
Richmond	0	21	20		1	0	0	3
Roanoke	1	4	16		0	0	0	0
West Virginia:								
Charleston	2	2	1	1	1	0	0	0
Wheeling	1	0	1		0	0	0	1
North Carolina:								
Raleigh	0	4	3		0	0	0	0
Wilmington	1	2	1		0	0	0	1
Winston-Salem	0	6	11		0	0	1	0
South Carolina:								
Charleston	0	1	1	10	0	0	0	0
Columbia	0	1	0		0	0	2	2
Georgia:								
Atlanta	2	9	8	11	0	0	1	4
Brunswick	0	0	0		0	0	0	0
Savannah	0	2	3	4	1	0	0	1
Florida:								
Miami	0	1	3		0	65	0	1
Tampa	0	2	11		0	1	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	1	1	0		0	0	0	1
Tennessee:								
Memphis	2	9	8		1	2	0	6
Nashville	0	3	4		0	0	0	3

City reports for week ended October 24, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL—continued								
Alabama								
Birmingham	0	6	4		1	0	0	5
Mobile	0	2	1		0	0	0	0
Montgomery	0	3	4			1	3	
WEST SOUTH CENTRAL								
Arkansas								
Fort Smith	0	2	3			1	0	
Little Rock	0	1	2		0	0	0	2
Louisiana								
New Orleans	0	10	13	3	4	1	0	13
Shreveport	0	2	2		0	3	0	3
Texas								
Dallas	1	17	7		0	1	0	0
Fort Worth	1	4	10		1	0	0	1
Galveston	0	0	0		0	0	0	2
Houston	0	7	13		0	1	0	4
San Antonio	0	3	2		1	0	0	4
MOUNTAIN								
Montana								
Billings	0	0	0		0	0	0	0
Great Falls	1	1	0		0	1	0	0
Helena	0	0	0		0	1	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	0	0	0
Colorado:								
Denver	18	8	3		0	0	6	7
Pueblo	3	1	0		0	0	0	0
New Mexico:								
Albuquerque	1	0	4		0	0	0	3
Arizona								
Phoenix	0	0	3		0	0	0	1
Utah:								
Salt Lake City	13	3	1		1	0	1	2
Nevada								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	27	5	1			6	10	
Spokane	6	2	0			1	1	
Tacoma	0	4	1		0	0	0	2
Oregon								
Portland	18	7	1		0	2	7	3
Salem	2	0	1	2	0	0	0	0
California:								
Los Angeles	12	30	35	24	0	5	6	13
Sacramento	2	2	1		1	16	0	2
San Francisco	19	12	1	4	2	7	3	6

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	2	0	0	0	0	0	0	0	0	1	19
New Hampshire:											
Concord	0	0	0	0	0	1	0	0	0	0	14
Vermont:											
Barre	0	1	0	0	0	0	0	0	0	1	1
Burlington	0	0	0	0	0	0	0	0	0	0	14

City reports for week ended October 24, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND—continued											
Massachusetts:											
Boston	37	28	0	0	0	9	2	3	0	11	198
Fall River	2	11	0	0	0	1	0	3	0	0	17
Springfield	3	4	0	0	0	1	0	0	0	2	24
Worcester	8	22	0	0	0	1	0	1	0	9	54
Rhode Island:											
Pawtucket	0	0	0	0	0	1	0	0	0	0	11
Providence	4	6	0	0	0	0	0	3	0	1	44
Connecticut:											
Bridgeport	4	2	0	0	0	2	0	0	0	0	27
Hartford	3	4	0	0	0	1	0	0	0	12	40
New Haven	2	3	0	0	0	0	1	2	1	5	37
MIDDLE ATLANTIC											
New York:											
Buffalo	14	31	0	0	0	7	1	0	0	11	130
New York	53	62	0	0	0	91	22	36	3	142	1,294
Rochester	4	16	0	0	0	2	0	0	0	4	68
Syracuse	3	16	0	0	0	1	0	6	0	24	43
New Jersey:											
Camden	2	2	0	0	0	2	0	0	0	6	24
Newark	6	12	0	0	0	9	2	1	0	58	-------
Trenton	1	3	0	0	0	1	1	1	0	3	32
Pennsylvania:											
Philadelphia	40	60	0	0	0	22	7	8	0	94	413
Pittsburgh	29	21	0	0	0	9	1	2	0	36	163
Reading	1	0	0	0	0	1	0	0	0	7	24
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	13	32	0	0	0	8	1	0	0	9	123
Cleveland	19	35	0	0	0	16	1	7	1	93	184
Columbus	7	6	0	0	0	2	1	1	0	2	77
Toledo	9	8	0	1	0	5	1	2	0	12	65
Indiana:											
Fort Wayne	1	0	0	0	0	1	0	0	0	0	28
Indianapolis	11	3	0	0	0	11	0	0	1	9	-------
South Bend	2	-------	1	-------	-------	-------	0	-------	-------	-------	-------
Terre Haute	2	1	0	0	0	1	0	0	0	0	19
Illinois:											
Chicago	66	70	0	0	0	46	5	4	1	136	689
Springfield	2	11	0	0	0	0	0	0	0	8	16
Michigan:											
Detroit	54	43	1	0	0	10	3	6	0	65	228
Flint	9	7	0	0	0	0	1	1	0	3	26
Grand Rapids	7	2	0	0	0	0	0	1	0	0	29
Wisconsin:											
Kenosha	1	2	0	0	0	0	0	0	0	2	5
Madison	2	0	0	0	-------	-------	0	0	-------	1	-------
Milwaukee	15	16	0	0	0	3	0	0	0	65	103
Racine	2	3	0	0	0	1	0	0	0	5	10
Superior	2	0	0	0	0	0	0	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	6	0	0	0	0	1	0	0	0	0	14
Minneapolis	29	6	1	0	0	2	1	0	0	15	96
St. Paul	15	8	0	0	0	1	1	0	0	2	55
Iowa:											
Davenport	1	3	0	0	-------	-------	0	0	-------	1	-------
Des Moines	6	1	0	0	-------	-------	0	0	-------	0	27
Sioux City	2	2	0	1	-------	-------	0	0	-------	1	-------
Waterloo	1	0	0	2	-------	-------	0	0	-------	2	-------
Missouri:											
Kansas City	10	15	0	0	0	3	1	0	1	15	91
St. Joseph	2	3	0	0	0	1	0	1	0	0	24
St. Louis	28	16	0	0	0	21	4	7	1	51	205

City reports for week ended October 24, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL—contd.											
North Dakota:											
Fargo	3	1	0	0	0	1	0	1	0	1	6
Grand Forks	0	0	0	0			0	0		3	
South Dakota:											
Aberdeen	0	1	0	0			1	0		6	
Nebraska:											
Omaha	4	4	0	2	0	1	0	1	0	3	60
Kansas:											
Topeka	4	3	0	0	0	1	0	0	0	5	13
Wichita	3	4	0	0	0	0	0	0	0	0	27
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	1	0	0	0	2	0	2	0	3	25
Maryland:											
Baltimore	12	17	0	0	0	21	6	3	1	84	211
Cumberland	0	5	0	0	0	1	1	1	0	3	10
Frederick	0	0	0	0	0	0	0	0	0	0	1
District of Col.:											
Washington	13	15	0	0	0	14	2	0	1	10	172
Virginia:											
Lynchburg	3	1	0	0	0	2	0	1	0	2	11
Norfolk	0	9	0	0	0	2	1	0	0	2	
Richmond	8	15	0	0	0	6	0	0	0	4	59
Roanoke	3	0	0	0	0	1	0	0	0	0	14
West Virginia:											
Charleston	2	1	0	0	0	1	1	1	0	3	12
Wheeling	2	0	0	0	0	0	1	0	0	0	13
North Carolina:											
Raleigh	1	5	0	0	0	0	0	0	0	3	13
Wilmington	1	1	0	0	0	0	0	0	0	0	11
Winston-Salem	3	3	0	0	0	3	0	3	0	12	19
South Carolina:											
Charleston	1	0	0	0	0	1	1	0	0	1	15
Columbia	1	4	0	0	0	0	0	0	1	0	23
Georgia:											
Atlanta	8	10	0	2	0	3	1	2	1	1	77
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	2	0	0	0	0	3	0	0	1	1	33
Florida:											
Miami	0	0	0	0	0	0	0	0	0	0	22
Tampa	0	1	0	0	0	1	0	0	0	0	24
EAST SOUTH CENTRAL											
Kentucky:											
Covington	3	3	0	0	0	0	0	1	0	0	9
Tennessee:											
Memphis	5	7	0	0	0	6	3	8	1	24	84
Nashville	1	3	0	0	0	4	2	1	0	2	36
Albama:											
Birmingham	5	7	0	0	0	3	2	3	0	2	67
Mobile	0	2	0	0	0	0	0	4	0	0	15
Montgomery	1	3	0	0			0	1		2	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	2	0	0			0	0		1	
Little Rock	2	0	0	0	0	2	0	0	0	0	4
Louisiana:											
New Orleans	4	7	0	0	0	8	3	8	2	2	121
Shreveport	1	2	0	0	0	1	1	0	0	3	26
Texas:											
Dallas	6	5	0	0	0	5	1	1	0	0	49
Fort Worth	2	4	0	0	0	1	0	0	0	0	32
Galveston	0	0	0	0	0	0	0	0	0	0	15
Houston	2	1	0	1	0	2	0	2	2	5	53
San Antonio	1	0	0	0	0	5	0	0	0	0	57

City reports for week ended October 24, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	4
Great Falls	1	0	0	0	0	0	0	0	0	1	-------
Helena	1	0	0	0	0	0	0	0	0	0	3
Missoula	0	3	0	0	0	0	1	0	0	0	2
Idaho:											
Boise	0	1	0	0	0	0	0	0	0	0	3
Colorado:											
Denver	9	14	0	0	0	2	0	2	0	5	63
Pueblo	1	1	0	0	0	1	1	0	0	0	7
New Mexico:											
Albuquerque	1	1	0	0	0	5	1	2	0	1	18
Arizona:											
Phoenix	1	1	0	0	0	2	0	0	0	2	-------
Utah:											
Salt Lake City	3	1	1	0	0	1	4	0	0	1	37
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	9
PACIFIC											
Washington:											
Seattle	8	8	0	0	-------	-------	2	0	-------	5	-------
Spokane	4	0	1	0	-------	-------	1	0	-------	0	-------
Tacoma	3	3	1	1	0	1	1	0	0	4	19
Oregon:											
Portland	6	0	3	0	0	4	0	1	0	5	79
Salem	0	0	0	0	0	0	1	0	0	1	-------
California:											
Los Angeles	16	55	0	0	0	23	2	0	0	25	268
Sacramento	3	1	0	0	0	4	0	2	0	0	33
San Francisco	10	5	1	5	0	7	1	1	0	4	136

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis: Cases	Poliomyelitis: Deaths
NEW ENGLAND									
Vermont:									
Burlington	0	0	0	0	0	0	0	0	1
Massachusetts:									
Boston	1	1	0	0	0	0	3	14	1
Fall River	0	0	0	0	0	0	0	1	0
Springfield	0	0	0	0	0	0	1	1	1
Worcester	0	0	0	0	0	1	1	5	0
Rhode Island:									
Providence	0	0	0	0	0	0	1	2	0
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	2	1
Hartford	0	0	0	0	0	0	0	2	2
MIDDLE ATLANTIC									
New York:									
New York	6	3	2	0	0	0	11	62	6
Rochester	0	1	0	0	0	0	0	4	0
New Jersey:									
Newark	0	0	0	0	0	0	0	8	0
Pennsylvania:									
Philadelphia	2	0	0	0	0	0	1	14	1
Reading	0	0	0	0	0	0	0	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	2	1	0	0	0	0	1	0	0
Cleveland	1	0	1	0	0	0	1	1	0
Toledo	0	0	0	0	0	0	0	1	0
Indiana:									
Fort Wayne	0	0	0	0	0	0	0	2	0

City reports for week ended October 24, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL—continued									
Illinois:									
Chicago	4	4	0	0	0	0	4	9	1
Springfield	1	0	0	0	0	0	0	0	0
Michigan:									
Detroit	2	0	0	0	0	0	2	10	0
Grand Rapids	0	0	0	0	0	0	0	1	1
Wisconsin									
Madison	0	0	0	0	0	0	0	1	0
Milwaukee	2	2	0	0	0	0	0	2	0
Superior	0	0	0	0	0	0	0	1	1
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	0	0	0	0	1	10	0
St. Paul	0	0	0	0	0	0	0	4	1
Iowa:									
Waterloo	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	1	0	0	0	0	0	0	0	0
St. Louis	2	2	1	0	0	0	0	1	0
SOUTH ATLANTIC									
Maryland.									
Baltimore	0	0	0	0	0	2	1	1	0
District of Columbia:									
Washington	0	0	0	0	1	0	1	0	0
Virginia:									
Norfolk	0	0	0	0	0	0	0	1	0
West Vriginia:									
Charleston	0	0	0	0	0	0	0	0	1
South Carolina:									
Charleston	0	0	0	0	3	0	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Georgia:									
Savannah [1]	0	0	0	0	1	0	0	0	0
Florida.									
Miami	0	0	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Alabama:									
Birmingham	0	0	0	0	1	0	0	0	0
Mobile	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	1	0	0	0	3	2	0	0	0
Shreveport	0	0	0	0	0	1	0	0	0
Texas. [1]									
Galveston	1	1	0	0	0	0	0	0	0
San Antonio [1]	0	1	0	0	0	0	0	0	0
MOUNTAIN									
Montana:									
Great Falls	0	0	0	0	0	0	0	1	0
Missoula	0	0	0	0	0	0	0	1	1
Arizona:									
Phoenix	0	1	0	0	0	0	0	1	0
PACIFIC									
Washington:									
Seattle	0	0	0	0	0	0	1	1	0
Spokane	0	0	0	0	0	0	1	2	0
Tacoma	0	0	0	0	0	0	1	1	0
Oregon:									
Portland	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	0	0	0	0	0	0	0	2	0
San Francisco	0	1	0	0	0	0	1	1	0

[1] Typhus fever, 5 cases: 3 cases at Savannah, Ga.; 1 case at Dallas, Tex.; and 1 case at San Antonio, Tex.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended October 24, 1931, compared with those for a like period ended October 25, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, September 20 to October 24, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930
98 cities	45	56	56	60	65	70	70	70	[2] 82	77
New England	38	56	50	53	72	58	46	70	87	106
Middle Atlantic	25	31	25	40	40	40	34	33	32	34
East North Central	42	74	44	79	53	99	61	91	[2] 75	105
West North Central	71	58	90	60	99	68	128	76	145	66
South Atlantic	67	100	150	68	132	116	170	100	223	106
East South Central	128	30	140	102	221	96	233	143	122	179
West South Central	101	136	108	104	74	59	101	118	142	80
Mountain	52	62	78	9	36	44	52	18	35	62
Pacific	41	26	41	51	47	81	47	87	76	101

MEASLES CASE RATES

	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930
98 cities	15	18	18	19	29	22	26	35	[2] 32	36
New England	31	46	24	36	137	34	70	48	180	75
Middle Atlantic	9	13	12	12	15	15	20	22	19	29
East North Central	16	13	12	5	13	11	13	14	[2] 18	16
West North Central	4	29	10	70	2	77	10	143	6	143
South Atlantic	8	10	2	22	6	12	14	8	10	14
East South Central	0	66	29	0	0	18	0	6	17	24
West South Central	3	10	17	7	27	0	10	3	24	3
Mountain	44	26	35	70	52	115	78	194	17	141
Pacific	51	16	78	22	106	20	96	57	69	18

SCARLET FEVER CASE RATES

	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930
98 cities	57	71	65	71	99	95	101	120	[2] 127	121
New England	53	87	132	80	144	116	137	162	195	157
Middle Atlantic	45	32	51	46	76	51	74	85	100	78
East North Central	62	117	62	106	112	135	139	177	[2] 142	171
West North Central	65	77	94	72	86	93	94	116	119	116
South Atlantic	67	62	59	76	142	126	124	126	156	162
East South Central	93	114	70	66	233	161	70	132	145	149
West South Central	34	52	37	35	61	35	41	73	57	70
Mountain	122	97	96	115	139	291	44	238	174	167
Pacific	71	75	72	73	67	75	110	51	141	89

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931 and 1930, respectively.
[2] South Bend, Ind., not included.

Summary of weekly reports from cities, September 20 to October 24, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930.—Continued

SMALLPOX CASE RATES

	Week ended—									
	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930
98 cities	0	3	0	1	1	2	1	2	[2] 2	2
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	0	2	0	1	0	2	0	4	[2] 0	2
West North Central	6	14	2	0	2	6	6	0	10	0
South Atlantic	0	0	0	2	4	0	0	0	4	0
East South Central	0	0	0	0	0	0	6	0	0	0
West South Central	0	3	0	3	0	3	0	3	3	7
Mountain	0	0	0	0	0	0	9	26	0	0
Pacific	0	16	0	0	10	6	2	0	12	18

TYPHOID FEVER CASE RATES

	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930
98 cities	21	17	21	20	20	20	18	16	[2] 22	17
New England	5	12	17	12	19	22	10	10	29	29
Middle Atlantic	16	13	21	14	15	14	16	10	24	12
East North Central	15	9	9	9	5	9	8	7	[2] 12	5
West North Central	36	15	13	14	11	10	33	15	19	8
South Atlantic	43	56	65	42	53	70	49	62	26	40
East South Central	47	18	52	60	64	42	52	42	105	84
West South Central	47	35	24	52	78	49	41	21	37	24
Mountain	26	44	26	115	35	44	9	35	17	79
Pacific	10	12	16	16	10	16	4	22	6	16

INFLUENZA DEATH RATES

	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930
91 cities	2	2	3	2	3	5	5	5	[2] 4	5
New England	0	2	2	0	2	5	2	7	2	2
Middle Atlantic	1	2	3	2	4	6	6	4	2	6
East North Central	3	2	2	1	2	3	2	4	[2] 3	3
West North Central	0	0	12	0	0	6	0	3	3	9
South Atlantic	4	4	0	2	0	2	0	6	10	4
East South Central	6	13	6	13	6	0	6	0	13	6
West South Central	0	4	0	11	7	11	14	7	17	7
Mountain	0	0	0	18	17	9	35	9	9	9
Pacific	0	5	0	2	5	0	5	7	7	7

PNEUMONIA DEATH RATES

	Sept. 26, 1931	Sept. 27, 1930	Oct. 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930
91 cities	52	57	53	58	55	71	64	72	[2] 69	86
New England	67	39	58	44	77	70	75	87	50	99
Middle Atlantic	55	72	60	59	56	74	63	70	78	102
East North Central	38	47	35	53	35	55	45	50	[2] 51	52
West North Central	44	36	59	69	56	87	100	54	91	60
South Atlantic	51	56	61	52	79	86	87	96	67	136
East South Central	32	65	63	104	69	123	69	162	95	84
West South Central	52	71	66	71	76	110	59	89	97	125
Mountain	70	53	61	132	35	97	87	194	78	79
Pacific	86	40	53	40	55	40	65	65	55	60

[2] South Bend, Ind., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended October 17, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended October 17, 1931, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia			2	2		
New Brunswick						6
Quebec				101		30
Ontario	4		2	8	9	31
Manitoba						5
Saskatchewan					1	5
Alberta				2		1
British Columbia	1	1				1
Total	5	1	4	113	10	79

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended October 10, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended October 10, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Paratyphoid fever	1
Chicken pox	46	Poliomyelitis	143
Diphtheria	38	Scarlet fever	48
German measles	30	Tuberculosis	45
Measles	55	Typhoid fever	48
Mumps	3	Whooping cough	29

PANAMA CANAL ZONE

Communicable diseases—September, 1931.—During the month of September, 1931, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	17		Meningitis, meningococcus	1	
Diphtheria	3	1	Mumps	2	
Dysentery (amebic)	1		Pneumonia		27
Leprosy	1		Poliomyelitis	1	
Malaria	140	3	Tuberculosis		30
Measles	26	1	Whooping cough	10	

PORTO RICO

San Juan—Communicable diseases—Four weeks ended October 10, 1931.—During the four weeks ended October 10, 1931, cases of certain communicable diseases were reported in San Juan, Porto Rico, as follows:

Disease	Cases	Disease	Cases
Diphtheria	4	Ophthalmia neonatorum	2
Filariasis	3	Pellagra	1
Influenza	1	Tetanus	1
Malaria	66	Tetanus, infantile	1
Measles	15	Whooping cough	16

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31
Ceylon: Colombo	C	1	1		1	1	1											
	D	1	1		1	1	1											
China:																		
Canton	C	2	1						1	1								
	D	1																
Shanghai	C			1		1	5	1	1	58	30	36	35	29	17	17		
	D									3	4	2	5	8				
Swatow	C		10	7														
Tientsin	C	1	10															
	D	1	1															
India	C	13,604	18,001	22,074	7,357	9,848	9,817	9,492	10,734									
	D	7,270	10,337	12,093	4,029	5,584	5,411	5,252	6,044									
Bombay	C			23	9	18	6	11	27	5	5	5	1	1	2			
	D			16	4	9	7	5	9	5	2	1		1	2			
Calcutta	C	265	292	237	42	27	20	21	10	3	15	18	18	23	3			
	D	149	168	155	10	7	7	6	4	2	3	6	6	12				
Chittagong	C															1		
Karikal	C	12					1		1			1	1					
	D	7					1		1			1						
Madras	C	52	9	4	1		2	3	3	1	1							
	D	17	4															
Moulmein	C			1														
	D			1														
Negapatam	C								1									
Rangoon	C	2	4	4		1	1						1				1	
	D	1	2	1		1	1						1				1	
Vizagapatam	C		1															
India (French):																		
Chandernagor	C	4	3	6	1	4	2			1	1		1					
	D	4	3	1	1	4	2			1	1		1					
Pondicherry	C	17	3	3	1	1	1		2			2		1				
	D	7	3	3	1		1		1			1						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31
India (Portuguese)	C		1	2		1		1	1	2	25	6						
	D			1		1		1	1	1	10	6						
Indo-China (see also table below):																		
Cochin-China—Rachgia	C				P													
Pnompenh	C		1	5		1		1			1	1		1				
	D	2	1	2		1					1	1		1				
Saigon and Cholon	C	104	61	14											1			
	D	76	41	7											1			
Iraq:																		
Abulkhasib	C								6									
	D								5									
Amara	C							2	22	35	8	1			2	2	2	
	D							1	21	30	7	1				1	1	
Amara Province	C								6	11	106	73	32	21	15	27	13	7
	D								5	4	67	44	29	24	14	17	10	6
Basra	C				3	9	263	272	148		54	91	77	19	29	32	28	30
	D				2	8	140	137	76		30	48	34	11	13	23	7	18
Basra Province	C							5	14	6	10	23	26	14	1	1	3	7
	D							2	10	3	7	10	9	8	1	1	1	4
Dinwaniyah	C												1					
Dinwaniyah Province	C												15	8	14	24	22	1
	D												11	6	5	22	10	5
Iwaniyah	C												22					
	D												15					
Muntafiq Province	C								10	21	66	128	55	54	15	55	17	19
	D								8	20	42	75	38	57	28	37	10	18
Nasiriyah	C									22	50	16	4	4	18	7	4	7
	D									15	40	20	3	4	18	3	3	6
Suqelshuyukh	C								2									
	D								2									
Persia:[1]																		
Rafsanjan[2]	C	36																
	D	14																

Philippine Islands: [3] Provinces—																		
Capiz	C	17	4							9	9	17	49	21	5	4		7
	D	15	4							5	6	5	35	16	5	3		5
Cebu	C					1	1	1										
	D					1	1	1										
Iloilo	C		26	27														
	D		21	25														
Negros, Occidental	C		2															
	D		1															
Pampanga	C	1																
Siam	C	14	4	3				1	1									
	D	5	2	1					1									
Bangkok	C	3	1	4				1	1									
	D	1	1	2														
On vessel:																		
S. S. Arankola, at Rangoon, from Calcutta	C	1																
S. S. City of Eastborne, at Calcutta from Cocanada	C		1															
S. S. Tairea, at Penang, from Calcutta	C		1															
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C			1														
	D			1														
S. S. Kohistan, at Basra, from Bushire, Persia	C			2														
S. S. Cathay, at Kobe, Japan, from Shanghai	C							4										
	D							1										
S. S. Kasagi Maru, at Moji, from Shanghai	C									1								
S. S. Ankoo, at Nagasaki, from Shanghai	C										2							
	D										1							

Place		February, 1931	March, 1931	April, 1931	May, 1931			June, 1931			July, 1931			Aug. 1-10, 1931
					1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31	
Indo-China (French) (see also table above):														
Cambodia [4]	C	125	100	113	33	44	40	83	96	129	72	82	87	12
	D	80	29	70	20	22	21	45	64				60	2
Cochin-China [4]	C	29	105	107	47	52	75	71	69		66	30	47	39
	D	18	73	74	36	40	57	52	54				42	32

[1] The reports of cholera in Abadan, Ahwaz, and Mohammerah, Persia, published in Public Health Reports for Nov. 6, 1931, were not confirmed upon bacteriological examination.
[2] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.
[3] Figures for cholera in the Philippine Islands are subject to correction.
[4] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31
Algeria:																			
Algiers	C					2													
Bone	C			1															
Philippeville	C				1			1	1										
	D				1			1											
Argentina: San Juan Province	C				P														
Belgian Congo	C			1															
	D			1															
British East Africa (see also table below):																			
Tanganyika	C	18	46	17	6			8					4	8					
	D	21	30	10	6			2					4	4					
Uganda	C	35	138	298	418	71	93	69	52	59	59	107							
	D	32	126	286	400	71	63	68	49	61	56	107							
Ceylon: Colombo	C	4	3	2	1	4	1	1			1	1	1		1	2			
	D	3	3	2	1	4	1	1			1	1	1		1	1			
Plague-infected rats		1	5			1	3	4											
China:[1]																			
Amoy	C		1																
	D		1																
Shansi Province[2]	C																		P
Shensi Province	C																		P
Dutch East Indies:																			
Batavia and West Java	C	74	59	116	75	12	11	20	15	19	18	8	20						
	D	71	59	66	75	12	11	20	15	19	18	8	20						
East Java and Madura	C	1	1																
	D	1	1																
Java and Madura	D	243	176	192	212	38	53	67	47	58	63	51	56	77					
Egypt:																			
Alexandria	C			4	13	4	3	1	1	2	2		1	1				1	
	D			4	5	1	2			1	1								
Assiout	C	32	18	11															
	D	17	7	1															
Beni-Suef	C	12	5																
	D	3	3																
Beheira	C					1		1			2								
Dakahlia	C				1		2												

Deirout	C	3	10	3															
	D	1	4	1															
Gharbieh	C			1															
	D			1															
Girga	C	44	7		1														
	D	22	2																
Kena	C	3	1																
	D	1	1																
Minieh	C	1	6	3	12														
	D		3	1	4														
Port Said	C			3	5	2												1	
	D		1	2	1														
Tanta	C							2			1		1						
France: Rouen-Devilleles	C																		P
Hawaii Territory:																			
Hawaii—Hamakua—Plague-infected rats			1					1											
Maui Island—																			
Haliimaile—Plague-infected rats													1						
Kula District	C						1												
	D						1												
Makawao—Plague-infected rats													1						
Paia—Plague-infected rats														1					
India	C	6,142	752	88	221	164	175	130	215	282									
	D	5,109	692	51	128	94	117	92	137	146									
Bassein	C	1	1		4		1		1		1	2	1	1					
	D	1	1		3		1		1		1	2	1	1					
Bombay	C	11	8		12											1			
	D	11	6		6											1			
Plague-infected rats		137	94	37	48	8	13	17	9	23	17	7	10	9	9	12			
Burma	C				16														
	D				10														
Calcutta	C	2																	
	D	2																	
Madras Presidency	C	3	2	6	21					9	75	30				3			
	D	2	1	1	9					4	51	20				1			
Moulmein	C				9					P	5								
	D				1						4	3	2	2					
Rangoon	C	1	2	1	2	1				2	1							5	
	D	1	2	1	1	1				1	1							1	
Plague-infected rats		4	7	3	6	1		1	1	1	1	1	1	1	1	1			
Indo-China (see also table below): Pnompenh	C			3															
	D	4		2															
Iraq:																			
Baghdad	C	23	23	23	3			1			2	1							
	D	8	9	9	2						1								
Maudhan	C		3																
Madagascar (see also table below): Tamatave	C					1						2		1					
Morocco	C													10					

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April. On September 19, 1931, 18 deaths were reported in Changchuanpu and new cases in Kaitung and Fengtien.

[2] On October 17, 1931, plague epidemic was reported in western Shansi Province, China, with 2,000 deaths at Hsinghsien.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25–1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31
Nigeria: Lagos	C	5																	
	D	5																	
Plague-infected rats		6																	
Peru (see table below).																			
Senegal (see table below).																			
Siam	C	1	2	1					1	1	1				1	1			
	D	1	2	1						1	1				1				
Spain: Hospitalet—Barcelona Province	C								5	1			1	1	1			5	
	D								2				1		1				
Syria: Beirut	C				2			1				1	1	1	2				
Tunisia: Tunis	C	16	16	11								1				1			
	D	8	3	1															
Union of South Africa:																			
Cape Province	C	3																	
	D	3																	
Plague-infected rats								1											
Orange Free State	C	2	2																
	D	2	2																

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
British East Africa (see also table above):							
Kenya	C	345	245	164	481	224	14
Indo-China (see also table above)	C	11		2	1		1
	D	2		2	1		1
Madagascar (see also table above):							
Ambositra Province	C	30	19	15	1		
	D	29	18	15	1		
Peru	C	8	2	5	3	19	
	D	1		1	2	14	
Senegal							
Baol [1]	C		4		27	101	13
	D		3		13	58	8
Dakar [1]	C	2	63	64	95	194	38
	D	1	49	56	73	106	24

Antsirabe Province	C	48	7	12	13		
	D	47	7	12	12		
Miarinarivo Province	C	6	2		8		
	D	6	2		7		
Moramanga Province	C		2	1	1		
	D		2				
Tananarive Province	C	41	18	10	5		
	D	40	18	9	5		

Diourbel [1]	C						9
	D						3
Louga [1]	C	1	5	4	3	2	4
	D		2	2	1	1	1
Rufisque [1]	C		1	2	34	2	1
Thies [1]	C			12	16	26	12
	D			3	7	16	8
Tivaouane [1]	C	4	19	3	3		
	D		11	2	2		

[1] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27–1931	June 28–July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17
Algeria:																	
Algiers	C	2	1	8	1												
Constantine	C		1		1						1						
Belgian Congo	C		47	42													
Bolivia.[2]																	
Brazil: Porto Alegre (alastrim)	C	53	19	5	41	11	6	17		7	13	12	16				
	D				1	1				2		2					
British East Africa: Tanganyika	C		13	7	149	1	18			31	4	6	9				
	D				17							1	4				
British South Africa:																	
Northern Rhodesia	C				21			26									
Southern Rhodesia	C			1	2						1						
Canada:																	
Alberta	C				1		1							12			
British Columbia	C				2	2			3		1	1					
Manitoba	C			4									1				
Winnipeg	C											1					
Nova Scotia	C	1															
Ontario	C	9	17	32	35	1		2	2	4		2		5	2	1	9
Kingston	C	5									1						
Ottawa	C			1								1		5	2		1
Sault Ste. Marie	C	4	1														
Toronto	C	4	1	1													
Quebec	C				1												
Saskatchewan	C	46	48	54	42		10	6	10	8	8	12	5	1	6	3	1
Regina	C	2	2											1			

[2] An epidemic of smallpox was reported on May 18 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17
Chile:																	
Antofagasta	C				1												
Chanaral	C		1														
China:										3							
Amoy	C	2	6	4	2	1						1		1			
	D	1	3	3	2	1						1		1			
Canton	C	4	3	1	2					1							
Foochow	C	P	P	P	P		P		P		P		P				
Hankow	C	3	5	4	3	1		1	1					1			
Hong Kong	C	3	1														
	D	1	2														
Manchuria—																	
Harbin (see also table below)	C		3														
Kwantung—Dairen	C	2	2	1													
Nanking	C	P	P				1										
Shanghai—																	
Foreigners only	C	17	7	11	3									35	29	17	17
Including natives	D	18	7	13	6				1	1			1	5	8		
Swatow	D	2															
Tientsin	C		2		3												
Chosen (see table below).																	
Colombia:																	
Cali	D		1														
Santa Marta	D											1					
Dutch East Indies:																	
Batavia and West Java	C		2														
East Java and Madura	C		1														
Eritrea	C		3		2					10							
	D									2							
Finland	C	1															
France (see table below).																	
Great Britain:																	
England and Wales	C	744	570	237	187	26	25	19	21	33		19	45	45	41	34	41
Bradford	C	6	8	5													
Leeds	C	2	2														

London	C	227	183	122	54	6	12	4	4	3	9	5	15	5	17	15	21
London and Great Towns	C	558	403	228	152	22	20	17	10	13	30	11	34	35	31	25	37
	D	2		1	1												
Sheffield	C	7										1	1				
Greece (see table below).																	
Honduras:																	
Puerto Castilla	C														1		
Tegucigalpa	C	1															
Tela	C	1															
India	C	14,265	11,403	7,313	5,350	978	904	645	400	483							
	D	2,923	1,849	1,704	1,352	234	213	179	120	144							
Bassein	C		1														
Bombay	C	8	9	6	6	1		1			1	2	2				
	D	5	4	5	6	1					1						
Calcutta	C	287	89	47	21	4	4		5	2	1	2		1			
	D	224	75	41	18		4		5	2	1	2		1			
Cochin	C	39	3				1	1	1					1	1	2	
Karachi	C	6		2		1											
	D			1													
Madras	C	19	8	2	2	1					1			1	5	6	
	D	5	6	1												2	
Negapatam	C	3		3	1		2			3		1			1		
Rangoon	C	11	13	6	3	2		1	1	1		1			2		
	D	1	5	2	1	1			1			1			1	1	
Vizagapatam	C	10	6	6	5		3		2	3	1	1	1	2	4		
	D	2	1	2	1		3		1	3	1	1	1		1		
India (French)																	
Chandernagor	C	10	7	1	3												
	D	7	5		2												
Karikal	C	4	4	6	4	1	1	3	2		2	5			5		
	D	3	4	6	4	1	1	2	2		2	1			1		
Pondicherry Province	C	6	11	7	28	11	6		3	1	6	1	18				
	D	9	11	7	28	11	6		3	1	6	1	16				
India (Portuguese)	C	21	3														
	D	6	1														
Indo-China (see also table below):																	
Pnompenh	C		1	2													
	D		1														
Saigon and Cholon	C	1	2		3	1	1			1		3	2	1	4	1	
	D	1	1		1	1				1		2		1	2		
Iraq:																	
Baghdad	C	2	3	1								1					
	D		2														
Basra	C		2	1													
Mosul Liwa	C				1				1					5			
Ivory Coast (see table below).																	
Japan: Nagoya	C				1												
Mexico (see also table below).																	
Jalisco (State)—Guadalajara	D	1	2	1	3			2						1	1	2	
Mexico City and surrounding territory	C	43	45	25	22	8	2			2	2	1		2			
	D	14	11	13	8	1	1					1	1	1			
Monterrey	C			1													

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17
Mexico—Continued.																	
Torreon	C	1	1	3							1	1			1		
	D	2		2								1					
Vera Cruz	C	2	1														
Morocco (see table below).																	
Poland	C		3	3	18								1				
Portugal: Lisbon	C	56	67	43	45	17	12	8		10	21	18	17	16	11		
Rumania (see table below).																	
Siam	C	1	6	5	1							3					
	D		1	1	1												
Spain	C				7												
Straits Settlements	C	10	2				1										
	D	5	2														
Sudan (Anglo-Egyptian)	C	3	6	1								32					
	D		2									6					
Sudan (French) (see table below).																	
Syria (see table below).																	
Turkey (see table below).																	
Union of Socialist Soviet Republics (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P														
Natal	C								P			P					
Orange Free State	C	P	P	P	P			P	P	P	P						
Transvaal	C			P	P												
Upper Volta	C	3	88	12	2												
	D		1														
On vessel:																	
S. S. Clan McTavish at Manila from Chittagong	C	1															
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C	1							1								
S. S. Talodi at Suakin	C		1														

Place		March, 1931	April, 1931	May, 1931 1-10	May, 1931 11-20	May, 1931 21-31	June, 1931 1-10	June, 1931 11-20	June, 1931 21-30	July, 1931 1-10	July, 1931 11-20	July, 1931 21-31	August, 1931 1-10	August, 1931 11-20	August, 1931 21-31	September, 1931 1-10	September, 1931 11-20	September, 1931 21-30
Indo-China (see also table above)	C	261	142		17	41	30	16	1	1		7	29				7	27
	D	82								1		4	11				4	8
Ivory Coast	C														7			
Sudan (French)	C	4																
Syria: Beirut	C							1										

Place		January, 1931	February, 1931	March, 1931	April, 1931	May, 1931	June, 1931	July, 1931
China: Harbin (see also table above)	C			7		13	10	
Chosen	C	1		11		1	4	2
	D	1		3				1
France	C	4	16	15	6	54	9	20
Greece	C		4			3	1	
Mexico (see also table above)	D		3		1	1	2	
Morocco	C		4	6	7	49	48	23
Rumania	C			1		1		
Turkey	C	63	37	1		9	1	
	D	7	6					
Union of Socialist Soviet Republics	C			1,903	1,516	1,345		
Territories in Asia	C	194	532					
Ukraine	C	44	23					
Other territories in Europe	C	896	1,577					
Railroads, etc.	C	43	77					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Apr. 5–May 2, 1931	May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24
Algeria:																		
Algiers	C	3	7	9	2													
Bone	C							1	1									
Constantine Department	C	9	22	26	3	1							2		1			
Oran	C	1	2	2			1				1							
Australia, Western	C	1	1															
Bulgaria	C	30	16	30						1								
	D	3	4	6														
China:																		
Manchuria—Harbin	C	8		16														
Shanghai	C				3			1										
Tientsin	C	2																
Chosen (see table below).																		
Colombia: Cali	D										1							
Czechoslovakia (see table below).																		
Egypt:																		
Alexandria	C	1		3								1	1					
Beheira Province	C	4																
	D	2																
Cairo	C									1								
Great Britain: Scotland—Fife County	C		1															
Greece (see table below).																		
Guatemala (see table below).																		
Iraq: Baghdad	C		2															
	D		2															
Irish Free State:																		
Cork County—																		
Schull	C				1													
Skibbereen	C			2	1													
Kerry County—																		
Dingle	C		1															
Listowel	C			1														
Kildare County—Naas	C													1				

Limerick County—																		
Croom	C														1			
Glin	C											2			1			
Limerick	C				2	1												
Michelstown	C				1													
Rathkeale	C														1			
Mayo County—																		
Belmullet	C		1															
Castlebar	C								1									
Westport	C								1									
Japan	C			1														
Lithuania (see table below).																		
Mexico (see also table below):																		
Durango	D				1													
Mexico City, including municipalities in Federal District	C	170	75	46	53	7	6		5	5	1	2	2	4				
	D	50	33	19	12	5	3		2	1	1		2	2				
San Luis Potosi	D	3	2		4				1									
Torreon	C				1											1	1	
	D				1											1	1	
Morocco	C	13	42	101	102		2	1	5						1			
	D	1	4	6	8													
Palestine	C	5	4	5	2	3	3	1	4				4	4	1	1		2
Panama Canal Zone—Balboa	C		2															
Poland	C	538	298	97	53	10	4	10	7	6	2	1	2	2	8	3		
	D	28	18	4	5	1		1							1			
Rumania	C	70	169	80	11	7	9	4	3		4	6	3	1				
	D	8	18	13	5		1		1				1					
Syria	C		4															
Tunisia:																		
Sbeitla, vicinity of	C	12																
Tunis	C	13	29	73	2					1		1	1					
	D		3	4														
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P		P	P	P	P	P	P	P					
Municipality of East London	C			1		1												
Natal	C	P	P	P	P		P					1						
Orange Free State	C	P	P	P	12													
Transvaal	C	P	P	P	P		P	P	P	P	P	P	P					
Yugoslavia (see table below).																		

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Chosen: Seoul	C	3	4		6	1		
	D		1		1	1		
Czechoslovakia	C		5	11	2			
Greece	C	8	22	6	9	2	13	5
	D	1	3				2	
Guatemala	C				33	34	3	
	D				15	5		
Lithuania	C	99	34	10	13	8	2	
	D	3	5		2			
Mexico (see also table above)	D	238						
Turkey	C	15	32	13	11	9		
Union of Socialist Soviet Republics	C	2,206	1,513	1,324				
Yugoslavia	C	10	43	14	2	3	1	
	D	1	5					

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31
Brazil:																		
Alagoas State	C						1											
	D						1											
Ceara State	C	1	1					1										
	D	1						1										
Minas Geraes State	C	2																
	D	1																
Rio de Janeiro State	C	2																
Sergipe State	C		1															
British Cameroons: Mamfe	C	3	2															
	D	2																
Colombia: Magdalena Province—Near Cienaga	C			4														

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Mosquitoes Found to be Transported by Airplanes

White Blood Cells and Clinical Progress in Leprosy

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HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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MOSQUITOES TRANSPORTED BY AIRPLANES

Staining Method Used in Determining their Importation

By T. H. D. Griffitts, *Surgeon*, and J. J. Griffitts, *Scientific Assistant, United States Public Health Service*

INTRODUCTION

The possible importance of the aerial transportation of mosquitoes, particularly *Aëdes aegypti*, has been a matter of serious interest to public health officials for several years. With steady increase in passenger traffic by air, the establishment of airlines connecting practically all countries, and the ever increasing speed with which air travel is being accomplished, more and more have we become concerned with the public health aspect of air transport service. Soon after assuming charge of the Miami (Fla.) quarantine station, Surg. Carl Michel, medical officer in charge of the station, became interested in the question as to whether airplanes landing at Miami from tropical ports were carrying mosquitoes. Doctor Michel expressed the belief that mosquitoes were carried by airplanes.

For the purpose of determining whether or not mosquitoes are carried in airplanes, and, if so, to what extent, the distance of such transportation, the species of mosquitoes, and the types of planes on which they are carried, the United States Public Health Service began, on July 23, 1931, the inspection of all airplanes from tropical ports arriving at the airports of the Pan American Airways System at Miami. Officials of the Pan American Airways System readily and fully cooperated in the undertaking. This paper covers the period of airplane inspection from July 23 to September 18, including experiments with stained specimens of *Aëdes aegypti* placed on planes at San Juan, P. R., destined for Miami, Fla.

TYPES OF AIRPLANES OPERATING FROM AND TO MIAMI

There are three types of airplanes now operated, by the Caribbean division, Pan American Airways System, between Miami and ports in Cuba, Haiti, Dominican Republic, Porto Rico, South America (Colombia), Panama, Salvador, British Honduras, Honduras, Yucatan, and Jamaica. These are trimotor Fokkers, Sikorsky amphibians, and Commodores.

INSPECTION OF AIRPLANES FOR MOSQUITOES

Planes were boarded immediately after they had landed and discharged crews, passengers, baggage, and mail. Whenever practicable, doors, windows, and hatches were closed promptly to prevent the escape of mosquitoes. At first, the ordinary "chloroform tube" [1] was used, but later this was supplanted by a power-suction collector [2] devised by the senior writer. The windows, ceiling, and walls were first examined. Then a folded paper was used to brush under the seats, radio desk, and other protected places to drive out any resting mosquitoes. After the cabin had been examined, the cockpit, front and rear baggage compartments, rear fuselage, etc., were thoroughly inspected.

MOSQUITOES CAUGHT IN AIRPLANES

From July 23 to September 12, 1931, 102 inspections of arriving airplanes were made at Miami airports. Of these, 72 were Fokker trimotor planes from Habana (daily) and San Juan (triweekly); 16 were Sikorsky amphibians from Central America and Mexico (via Habana), and 14 were Commodores from Panama, Colombia, and Jamaica (via Cienfuegos). In all 29 mosquitoes (1 male *Aëdes aegypti* and 28 *Culex quinquefasciatus*)[3] were captured, 24 on the Sikorsky amphibian (majority in front baggage compartment), 1 on a Fokker (from Habana), and 4 on the DO-X. Notwithstanding the fact that the Commodore planes offer better protection for mosquitoes, none was found on them. (This may have been due to the lack of mosquito prevalence at landing fields, or to the practice of spraying these ships for mosquito destruction at ports where overnight stops are made.)

PROCEDURE IN EXPERIMENT WITH STAINED AËDES AEGYPTI IN AIRPLANES

In order to conduct exact experiments to determine, if possible, the distance mosquitoes may be carried by airplanes, the United States Public Health Service made arrangements with the Pan

[1] This is made in the usual way with a plug of rubber bands in bottom of tube, a wad of cotton and cork disk above (the latter not coming in contact with the chloroform-soaked cotton and rubber bands).

[2] This apparatus consists of a small vacuum cleaner (60 cycle, 110 volt, 100-watt, alternating or direct current) with brush removed from the suction end and rubber tubing attached (about 12 feet length). To the far end of the tubing is attached a celluloid collecting tube, with cork truncated cone fixed in the distal end and the rubber tube inserted in the back end through a perforated cork, the end of the rubber tubing being screened with a piece of gauze to prevent sucking the mosquitoes through the rubber tubing and into the machine. This has been found to be an efficient and rapid method for mosquito collecting, not only on airplanes but in general, in field investigations of malaria. By using as long a lead wire as required, the suction apparatus is simply plugged into an electric light or power socket, or into the socket of a home-light generator.

[3] Since September 18, representatives of the following additional species of mosquitoes have been found in the routine inspections of airplanes at Miami: *Mansonia titillans*, *Aëdes taeniorhynchus*, and *Anopheles albimanus*.

American Airways System whereby permission was given to liberate stained mosquitoes in planes at a selected airport, or airports, on the routes of the Caribbean division of the system. All plans having been made and equipment assembled, the senior writer proceeded from Miami to San Juan, P. R., by airplane, September 9, 1931. Not knowing how long the experiments might have to be continued, it was tentatively planned to put aboard at San Juan, mosquitoes stained with eosin, and others stained with aniline blue, at Port au Prince. The results from the first "cargo" were so strikingly positive that there was no necessity or advisability of conducting an experiment from the nearer port, Port au Prince.

As *Aëdes aegypti* are the mosquitoes with which we are most concerned in connection with aerial traffic, many hundreds of larvae and pupae of this species were collected (from a single container) in San Juan the day of arrival. Over the jar containing the larvae and pupae was placed a cage 12 inches by 8 inches by 8 inches. This was made with a framework of insulated copper wire, covered with a coarse mesh, cotton gauze. The larvae container was covered with gauze, with a hole cut in the center through which the mosquitoes came into the cage soon after emergence. When it was desired to remove the cage, the holes in the cage and in the larvae container cover were plugged with absorbent cotton. Within 3 or 4 days an abundant supply of adult *Aëdes aegypti* (with a small number of *Culex quinquefasciatus*) had emerged. These fed freely on raisins before being stained and placed on planes.

TECHNIQUE OF STAINING MOSQUITOES

The stain used was a 2 per cent aqueous solution of eosin (yellowish, water-soluble). The cage of mosquitoes (about 40 specimens) was hung about the level of the shoulders, and by the use of an atomizer the stain was sprayed against the cage, enough going through the mesh of the gauze to color most of the specimens. Approximately 20 c. c. of the dilute stain was used, and the staining was accomplished in two or three minutes' time. Care was exercised that the atomizer was held at least 18 inches away from the cage, to allow the heavier droplets to fall before reaching the specimens. If the specimens are sprayed to excess, many will die or become incapacitated for a reliable test. This, quite obviously, may result in not securing the staining of some of the specimens. However, one may be fairly assured of effective staining of a batch of mosquitoes within two or three minutes if the mesh of the gauze is not very fine and is stretched tightly over the frame.

RECOGNITION OF STAINED MOSQUITOES

The recognition of stained specimens does not depend upon seeing the stain on the recovered insect. In this experiment a *solvent* for the stain, composed of the following, was employed:

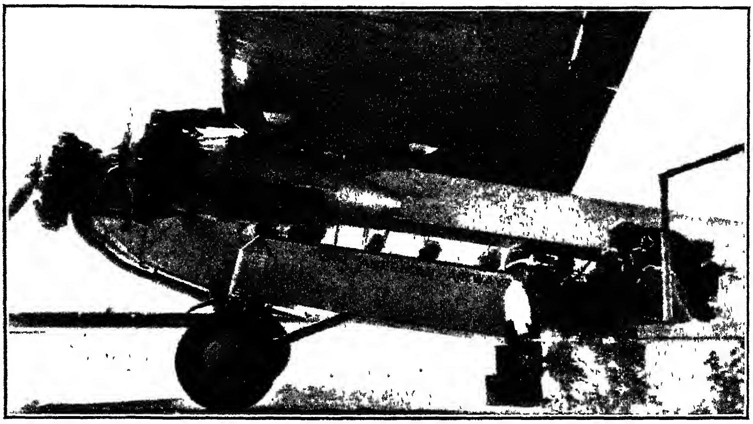
Glycerine	4 parts
Absolute alcohol	4 parts
Ether	1 part

After being mixed and standing for a few minutes a clear solution results.

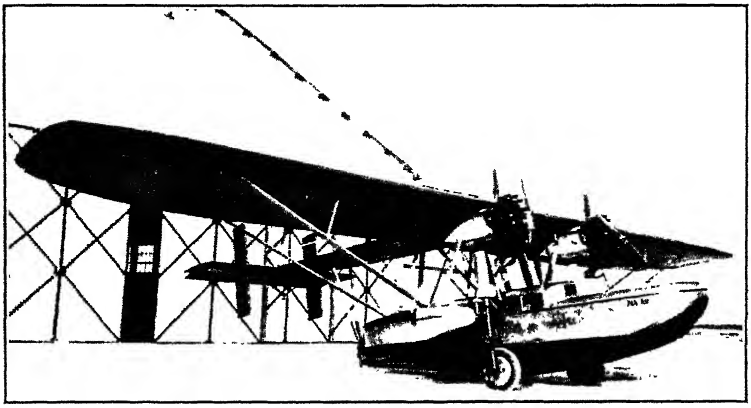
The captured mosquitoes were killed by exposure to vapor of chloroform and placed on a glass plate, or microscopic slide, with white paper beneath. A drop of the solvent was dropped on the mosquito, care being taken that the legs, wings, and all other parts were brought into the drop of solvent. (More than a good sized drop should not be used, as the dilution may render the reaction questionable in weakly stained specimens.) In freely stained mosquitoes the whole drop soon assumed a yellowish eosin color. Even a small amount of stain on a leg or other part gave a reddish-yellow tinge to the drop of solvent. This color will remain for several hours; but should the mosquito have had a blood meal, the blood will be dissolved after a few hours and this consequently, will be confusing.

RESULTS OF STAINED-MOSQUITO EXPERIMENTS

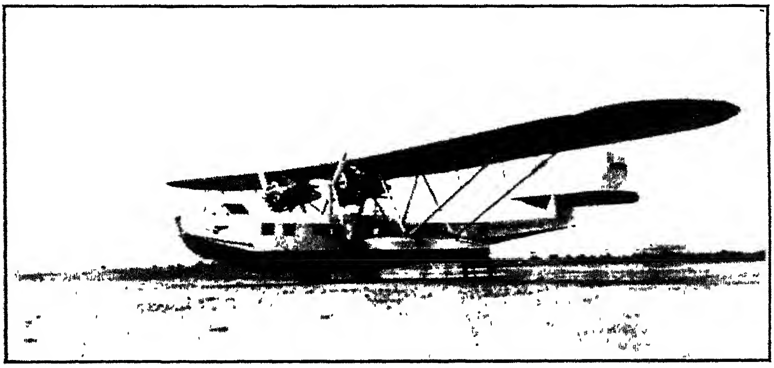
The first experiment with stained mosquitoes to determine whether they were transported by airplane was conducted at San Juan, P. R., September 13, 1931. Approximately 40 mosquitoes, practically all *Aëdes aegypti* (males and females) were subjected to stain from an atomizer at 5 a. m.; 40 minutes later all were released in the cockpit, cabin, and rear compartments of trimotor Fokker cabin plane No. 396–E which left San Juan four minutes later for Miami, Fla. The first landing was at Santo Domingo, Dominican Republic, 3 hours and 15 minutes after leaving San Juan. Here the ship discharged and took on passengers, baggage, and mail, and departed. (At airport 18 minutes.) The next landing was at Port au Prince, Haiti, 2 hours and 32 minutes after leaving Santo Domingo. Here the plane discharged and loaded passengers, mail, and baggage, departing after remaining at the airport 21 minutes. The time of flight to Camaguey, Cuba, was 3 hours and 16 minutes. At Camaguey the crew and passengers again left the plane and mail and baggage were exchanged. The plane left Camaguey at 1.08 p. m., and landed at Miami, Fla., 2 hours and 29 minutes later. The air distance covered was 1,250 miles, in 9 hours and 53 minutes, with three stops aggregating 1 hour and 9 minutes. Thirteen mosquitoes were recovered from the plane



Passengers boarding tri-motor Fokker airliner

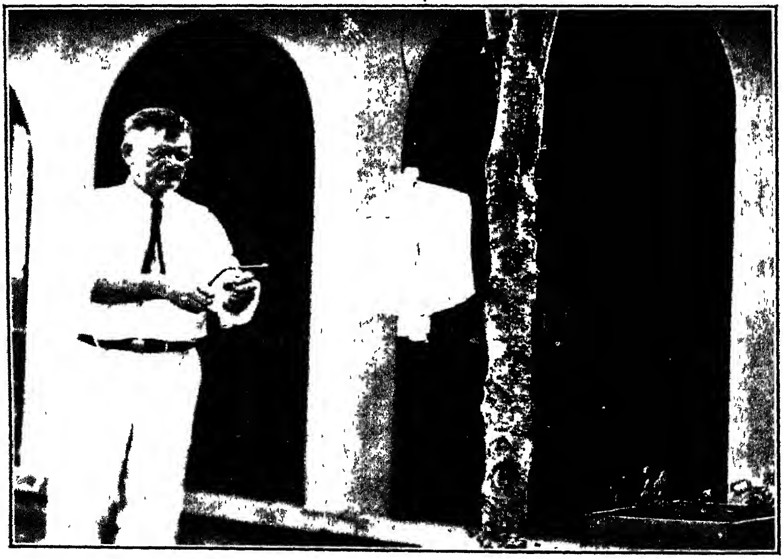


Sikorsky amphibian, operating between Miami, Central America, and Mexican ports



Commodore airliner (hydroplane), operating between eastern South American ports and San Juan, P. R., and between Miami and the Canal Zone, Colombia, Jamaica, and Cuba

Electric motor suction device for collecting mosquitoes



Staining mosquitoes before liberating them on airplanes

after landing at Miami (10 in the cabin and 3 in the rear fuselage). There were 10 *Aëdes aegypti* (4 males and 6 females), 2 *Culex quinquefasciatus*, and 1 unidentified specimen. Four of the *Aëdes aegypti*, when covered with the solvent, gave strong stain reaction.

On September 16, the experiment was repeated, with 30 stained specimens placed in the various compartments of the trimotor Fokker No. 9701, leaving San Juan at 5.40 a. m., and arriving at Miami at 3.50 p. m., after making the regular stops at Santo Domingo, Port au Prince, and Camaguey. Time of flight 10 hours and 10 minutes. Three of these specimens (two *Aëdes aegypti* and one *Culex*) were recovered on arrival at Miami. One of us (T. H. D.) was a passenger on this plane from San Juan to Port au Prince, and observed only one mosquito active on the plane during the trip. This mosquito bit the radio operator on the face when we were at an elevation of about 3,000 feet.

A third batch of stained mosquitoes was left at San Juan, and these were released on the plane leaving San Juan on the morning of September 18. One of the writers (T. H. D.) boarded this plane at Port au Prince at 9.55 a. m. and arrived at Miami at 4.06 p. m., having made one stop, 20 minutes, at Camaguey, Cuba. No mosquitoes were observed *en route*, although one of the pilots reported that he was bitten while in flight. Upon landing at Miami, two *Aëdes aegypti* immediately came from under the seat and attempted to bite. These two and three others were caught in the cabin and one was captured in the rear fuselage, making a total of six mosquitoes (all *Aëdes aegypti*) carried through on this plane from San Juan, P. R., to Miami, Fla. This airplane left San Juan at 5.34 a. m. and arrived at Miami at 4.06 p. m., stopping at Santo Domingo 22 minutes, Port au Prince 44 minutes, and Camaguey 20 minutes. The total time for the trip was 10 hours and 32 minutes, the flying time being 9 hours and 6 minutes, and time spent at intermediate airports, 1 hour and 26 minutes. The length of time that a plane remains at an airport may be important, inasmuch as the door to the cabin remains open, the crew and passengers leave the plane, and the baggage and mail are discharged and loaded, offering ample opportunity for mosquitoes to make their exit. However, *Aëdes aegypti* do not lead an out-door life, and, therefore, show a marked tendency to remain within inclosures.

SUMMARY

(1) Of the three types of passenger-carrying airplanes now operating round trips between Miami, Fla., and the West Indies, western coast of South America, Central America, Panama, Mexico, and Jamaica, the Commodore is physically best suited for carrying mosquitoes in the cabin; but, due to regular spraying with an insecticide or to lack of

mosquito prevalence at ports of departure, or call, no mosquitoes were found aboard these ships. The front baggage compartment of the Sikorsky amphibian is ideal for harboring mosquitoes. A large majority of the mosquitoes not intentionally placed on planes, in experimental work, were found in this compartment.

(2) One hundred and two inspections of airplanes arriving at Miami from foreign and insular airports were made from July 23 to September 12, 1931, and of this number 21, or 20.5 per cent, carried mosquitoes. In all, 29 mosquitoes were captured, 24 of which were taken on Sikorsky amphibian planes. Of these mosquitoes 28 were *Culex* and one was *Aedes aegypti*.

(3) *Aedes aegypti* (with a few *Culex quinquefasciatus*) numbering approximately 100, were developed from collected larvae and pupae, stained with a 2 per cent watery solution of yellowish eosin by means of an atomizer, then liberated on planes leaving San Juan, P. R., on September 13, 16, and 18, 1931. Of the 100 specimens put aboard on these three dates, 22 specimens were recovered at Miami, Fla., 1,250 miles distant, on the afternoons of the days of departure. The average time of these air trips was 10 hours and 10 minutes, 1 hour and 10 minutes of which were spent at intermediate landing fields. Eleven of the 22 recovered specimens showed strongly positive reactions to the stain solvent. The fact that not a single mosquito had been caught on the tri-motor Fokker planes arriving at Miami from San Juan from July 23 through September 12, and that 13 were caught on September 13, 3 on the 16th and 6 on the 18th, the only dates when mosquitoes were placed aboard, is strong enough evidence of their coming through even though only 50 per cent of them reacted to the stain solvent (glycerine 4 parts, absolute alcohol 4 parts, ether 1 part) after being recaptured.

(4) One mosquito was observed biting during flight of the plane on September 16, 1931, and at approximately 3,000 feet altitude over Dominican mountains.

CONCLUSIONS

That certain types of airplanes carry mosquitoes (particularly *Aedes aegypti* and *Culex quinquefasciatus*) has been proved. With conditions at airports such as would permit of many mosquitoes getting aboard, it might be expected that approximately one-fifth of the original number would be transported for a long distance—at least 1,250 miles—in one day, with repeated landing and the opening of doors, hatches and windows, and refueling, unloading, and loading taking place. Under average natural mosquito production conditions about airports, heavy infestation of aircraft (like the "loading" of planes in these experiments) would not be expected and, consequently, mosquitoes in only small numbers would make the trip.

However, even one infected, or infective, *Aëdes aegypti* might be the means of starting an epidemic. Notwithstanding the fact that airplanes may, or do, transport mosquitoes, this mode of introduction of mosquito-borne disease is probably secondary in importance to the importation of infected man.

With the relatively small number of mosquitoes carried by aircraft and the facility with which airplanes may be freed from mosquitoes at ports of departure, it may safely be concluded that, while there is a recognized potential danger, there is no obstacle to the efficient treatment of airplanes so as to destroy mosquitoes and avoid retardation of air traffic progress.

ACKNOWLEDGMENTS

Grateful acknowledgment of indebtedness, in connection with these studies, is extended to Mr. R. I. Dunten and all other officials and employees of the Pan American Airways System, who so courteously and fully cooperated, and to Surgeon L. E. Hooper, Surgeon Carl Michel, and Acting Assistant Surgeon J. Acosta Velarde, United States Public Health Service.

Appendix

Fokker tri-motor cabin planes, making three round-trips per week, operate between Miami and San Juan, P. R., stopping at Camaguey, Cuba, Port au Prince, Haiti, Santo Domingo, R. D. (stopping overnight here on the eastern trip) and arriving at San Juan the next morning about 8 o'clock. The return trip to Miami is made in one day. The Fokker is equipped for carrying 10 passengers, pilot and copilot, radio operator and steward. The cabin of the Fokker offers little disturbance in flight to mosquitoes. They may rest under the passengers' seats, the radio operator's desk, under the pilots' seats in the cockpit (more draft here than in the cabin), and especially may they be carried in the space of the back fuselage, which is occupied only by a net-work of metal trusses. At the forward part of the back fuselage is the baggage compartment, and here there is good protection from strong air currents. The toilet compartment between the baggage space and the cabin also may harbor mosquitoes.

Sikorsky amphibian passenger planes make round-trips between Miami and San Salvador, stopping *en route* at Tela, Belize, Cozumel, and Habana (over-night stop at Habana on the north bound trip). This plane is equipped for carrying eight passengers, pilot, copilot, radio operator, and steward. The cabin of this type of plane is generally subjected to more air draft in flight than either the Fokker or Commodore, but mosquitoes may be carried in the cabin. The front baggage compartment in the nose of the ship is closed in flight and free from air currents. It offers ideal conditions for resting

mosquitoes. A large percentage of those caught in the Miami routine inspections have been found in this compartment. Back of the cabin is a small compartment for toilet and radio equipment. This and the back fuselage space offer fair conditions for the carrying of mosquitoes.

Commodore cabin planes operate between Miami and Cristobal, C. Z., stopping at Baranquilla, Colombia, Kingston, Jamaica (overnight), and Cienfuegos, Cuba, on the north bound flight. The Commodore is a large seaplane equipped for carrying 21 passengers, pilot, copilot, steward, and radio operator. The cabin is divided into four sections, the rear two sections exclusively for passengers, the front two sections for the radio operator and steward and for baggage. The steward's seat and table are well protected from draft, but the radio operator's section is under the front hatch, exposed to draft when the hatch is open in flight. The cabin of this type of plane offers ample resting places for mosquitoes. This is particularly true of the spaces under the seats to which mosquitoes have easy access, and complete freedom from disturbing air currents. Mosquitoes may also rest in the three spaces in the back fuselage which are dark, not loaded, and wholly protected from draft.

LEPROSY

A STUDY OF THE WHITE BLOOD CELLS AND THEIR RELATION TO CLINICAL PROGRESS [1]

By L. F. Badger, *Passed Assistant Surgeon, United States Public Health Service, Leprosy Investigation Station, Honolulu, T. H.*

The knowledge of the cellular constituents of blood in normal individuals corresponding to the abnormal group studied is essential for the interpretation of the blood picture in diseased conditions. There is available no report on the white blood cell picture in normal residents of the Hawaiian Islands; therefore it is necessary to compare the results obtained in the group of lepers in this study with the so-called normal blood picture. In spite of the enormous amount of work done, there still lacks unanimity regarding the normal blood cell findings.

NORMAL NUMBERS OF WHITE BLOOD CELLS

In considering the normal white blood cell picture, the question arises what, if any, is the effect of race, climate, altitude, and age on the number of the various white blood cells in the circulating blood. If these factors affect the blood picture, they must be considered in the study of the white cellular constitution of the blood of lepers.

[1] Submitted for publication Oct. 1, 1929.

Before discussing the results of this study, these various factors will be considered briefly.

The group of lepers on which this report is based was composed of Hawaiians, Japanese, Chinese, Filipinos, Portuguese, and various mixtures of these races, 60 per cent being Hawaiian or part Hawaiian. They lived on the Hawaiian group of islands situated at approximately 20° north latitude, in a subtropical climate, and at sea level. Ninety-two per cent were over 15 years of age and none was under 10 years.

Race.—Fisher and Tsung (1) examined the blood of 75 healthy Chinese medical students. From a comparison of their results with those of Schilling, in Europe, and Miller, in North America, they concluded that the lymphocytes are increased in Chinese.

Chamberlain and Vedder (2) concluded from their study that the neutrophilic leucocytes are decreased and the lymphocytes are increased in normal Filipinos living in a tropical climate. Their results were approximately the same as those of Fisher and Tsung for Chinese in Shanghai.

Kop (3) examined 55 Europeans and 38 natives in Java and found a difference only in the number of eosinophiles, which were more numerous in the natives. He stated that the increase in the number of the eosinophiles was satisfactorily explained by the higher rate of infection with intestinal worms in the natives.

Mehrtens (4), in San Francisco, Wallace (5), in Tampa, Fla., and Fairley (6), in Melbourne, Australia, have found results in normal whites strikingly similar to those obtained by Fisher and Tsung in Chinese and Chamberlain and Vedder in the Filipinos.

TABLE 1.—*Neutrophilic, lymphocytic, and monocytic percentages on Chinese, Filipinos, and whites*

Observer	Race	Per cent of neutrophiles	Per cent of lymphocytes	Per cent of monocytes
Fisher and Tsung (1)	Chinese	53.5	35.3	6.1
Chamberlain and Vedder (2)	Filipinos	56.8	31.7	6.9
Mehrtens (4)	White	56.5	37.5	4.5
Wallace (5)	do	54.6	38.8	3.7
Fairley (6)	do	54.5	39.1	4.5

More conclusive evidence of the relation of race to the white blood cell picture is obtained when different racial groups, under the same conditions, are compared. A comparison of 1,500 counts on white and 300 on colored patients in the same hospital (Table 2) shows approximately the same counts. Likewise, the blood counts on 72 whites and 50 Filipinos living in the Philippine Islands (Table 2) are approximately the same.

TABLE 2.—*Neutrophilic, lymphocytic, and monocytic percentages in different racial groups under the same conditions*

Observer	Race	Per cent of neutrophiles	Per cent of lymphocytes	Per cent of monocytes
Lippincott (7)	White	61.85	30.6	6.5
	Colored	60.95	33.5	4.9
Chamberlain and Vedder (2)	White	56.8	31.7	6.9
	Filipinos	52.2	29.9	6.6

Climate.—It is believed by some investigators that the white blood cell picture varies with the climate. Wickline (8), from a study of the blood of American soldiers in the Philippines, concluded that the neutrophilic leucocytes are decreased and the lymphocytes are increased in the Tropics. His first examinations were made six months, and the third, or last, 22 months after the troops had arrived in the islands. In Table 3 are shown the changes which he observed.

TABLE 3.—*The effect of residence in the tropics on the neutrophiles and lymphocytes as observed by Wickline*

Type of cell	After 6 months' residence; 104 men—average per cent	After 14 months' residence; 97 men—average per cent	After 22 months' residence; 81 men—average per cent
Neutrophiles	64.43	60.04	54.87
Lymphocytes	21.80	26.61	33.38

Definite conclusions can not be drawn from this study, because 22 per cent of the men of the first examination were not included in the last examination. The report would have been more instructive if the blood cell counts of only the 81 men of the last examination were included for comparison. Wickline also stated that there occured an increase in the eosinophiles, running up to 40 per cent, and that he believed this increase was due to parasitic skin diseases or intestinal parasites. Such cases should have been excluded from the study, as such increases in the relative number of eosinophiles would alter the relative number of neutrophiles and lymphocytes.

Chamberlain and Vedder (2) concluded from their study on 72 Americans and 50 Filipinos that the neutrophiles decreased and the lymphocytes increased as a result of residence in the Tropics.

Kop (3) concluded from his study of the blood counts of 55 Europeans and 38 natives in Java that the cellular constitution of the blood of normal persons living in the Tropics is essentially identical with that observed in healthy persons dwelling in temperate climates.

Remarkable similarity in the percentages of the neutrophiles, lymphocytes, and the monocytes have been obtained, by various observers, in the blood of normal individuals living under widely varying climatic conditions (Table 4).

TABLE 4.—*Relative number of neutrophiles, lymphocytes, and monocytes in the blood of normal adults in various climates*

Observer	Place	Number examined	Per cent neutrophiles	Per cent lymphocytes	Per cent monocytes
Wickline (8)	Philippines	104	54 87	33 38	6. 15
Wallace (5)	South Florida	40	54. 6	38. 8	3. 7
Fairley (6)	Melbourne	29	54 5	39 1	4. 5
Sweet (9)	Brisbane	188	58 9	30 6	5. 5
Fisher and Tsung (1)	Shanghai	75	53. 5	35 3	6. 1
Mehrtens (4)	San Francisco	100	56. 5	37. 5	4. 5
Stains et al (10)	Colorado Springs	100	54. 5	36. 0	7. 0
Bunting (11)	Wisconsin	25	50. 60	30. 40	6. 10
Shaw (12)	England	116	53 2	36. 8	6. 7

Altitude.—Stains, Jones, and Rosenberg (10) concluded, from the comparison of the blood counts on 100 medical students in New York City, and 100 in Colorado Springs, that at an elevation of 6,000 feet there occurs an increase in the lymphocytes and a decrease in the neutrophiles. Table 4 reveals the fact that their results obtained at the higher altitude were not unlike those obtained at various elevations in widely separated localities. In order to draw conclusions as to the effect of altitude on the blood pictures, the same group of individuals should be examined at varying elevations. No such report is available.

Age.—That the white blood cell picture varies to a certain extent with age is an accepted fact. The blood picture of a child is not that of an adult, but the age at which the adult percentages of the white cells occur is debated. It has been variously reported as from 6 years to puberty.

From this brief discussion it may be stated that we have as yet no conclusive evidence that the white blood cell picture varies with race, climate, and altitude; and until such evidence is obtained, these factors may be disregarded in the determination of the effect of a disease process on the white blood cell picture.

What then are the normal numbers of the white blood cells in healthy adults? The normal number of the leucocytes as given in some of the standard textbooks are shown in Table 5.

TABLE 5.—*The normal white blood-cell picture as given in standard textbooks*

Author	Total number of leucocytes	Neutrophiles	Lymphocytes	Monocytes	Eosinophiles	Mast cells
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Emerson (15)		70-72	22-25	2-4	2-4	0 5
Simon (16)		60-70	20-30	1-6	1-4	.2-1
Green (17)		70 (60-75)	20 (20-25)	7-9	4 (0.5-5)	.1-0.5
Starling (18)		70	23	2-3	2-4	.5
Stohr & Lewis (19)		70-72	22-25	1-3	2-4	.5
Wright (20)	8,000	60-70	20-25	4-8	2-4	.5
Stitt (21)	7,000-10,000	65-75	22-36	3-6	1-2	.25-0.5
Schilling (22)	6,000-8,000	67 (54-73)	23 (21-35)	6 (4-8)	3 (2-4)	.5 (0-1)

The usually accepted standard is about as follows: Total leucocytes 5,000 to 10,000; neutrophiles 60 to 75 per cent; lymphocytes 20 to 30 per cent; monocytes 2 to 8 per cent; eosinophiles 1 to 4 per cent; and mast cells 0 to 0.5 per cent.

Recent reports of investigators in different parts of the world have given evidence that these numbers should no longer be accepted as normal. The percentage of neutrophiles is given as too high, that of the lymphocytes too low, and the variation of these cells not sufficiently great.

Sabin et al. (13) found in a normal individual a variation in the total number of leucocytes during 12 hours of from 7,200 to 13,680; in the neutrophiles from 37 to 60 per cent, and in the lymphocytes from 19 to 45 per cent.

Shaw (12) on the examination of 116 normal adults found the total number of white cells to vary from 3,200 to 9,650, and the neutrophiles from 37 to 69.8 per cent, and the lymphocytes from 22 to 51.2 per cent.

Mauriac and Cabouat (14) found the variation in the number of neutrophiles from 47 to 73 per cent.

Four reports on groups of adult hospital cases (Table 6) suffering, as far as could be determined, from no inflammatory process, show the average percentages of neutrophiles to be that of the generally accepted minimum per cent of that cell and the average percentages of the lymphocytes to be that of the generally accepted maximum per cent of that cell.

TABLE 6.—*The percentages of neutrophiles, lymphocytes, and monocytes in adult hospital cases suffering with no inflammatory process*

Observer	Number of cases	Per cent of neutrophiles	Per cent of lymphocytes	Per cent of monocytes
Lippincott (7)	1,500 (counts)	61.85	30.6	6.5
Do	300 (counts)	60 95	33.5	4.9
Wallace (5)	100 (cases)	60.0	33.3	4.1
Sweet (8)	188 (cases)	58.9	30.6	5.5

In Table 7 are shown the average percentages of the different types of the white cells obtained on normal adults by various observers of widely separated sections of the world. It will be noted that these percentages vary from those generally accepted as normal.

TABLE 7.—*The relative numbers of white blood cells on normal adults in widely separated sections of the world*

Observer	Place	Number examined	Neutrophiles	Lymphocytes	Monocytes	Eosinophiles	Mast cells
		Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Wallace (5)	South Florida	40	54 6	38.8	3.7	1.1	1.8
Roberts (23)	South Africa	150	42.5	38.8	12.7	5.1	.23
Connal (24)	West Africa	722	44 9	29.1	18.2	7.2	0.
Mehrtens (4)	San Francisco	100	56.5	37.5	4.57	.97	.52
Chamberlain and Vedder (2)	Philippines	50	52.2	29.9	4 6	10.6	.7
Do	do	72	56.8	31.7	6 9	3.8	.8
Fairley (6)	Australia	29	54.5	39.1	4.5	1.5	.4
Bunting (11)	Wisconsin	25	50–60	30–40	6–10	.8–4	.4–1.8
Stains, et al (10)	New York City	100	63	25	9	. 2.6	.3
Do	Colorado Springs	100	54.5	36	7	2.5	0.
Miller (25)	Baltimore	230	64.2	22.2	10 8	2.7	.6
Shaw (12)	England	116	53.2	36.8	6.7	2.5	.7
Kop (3)	Java	93	40	50	6	3.5	.5

This brief discussion strongly suggests that our conception of the standard numbers of the white blood cells is not correct and that there is need for studies to determine, as accurately as possible, the normals for healthy adults.

Leucocyte tide.—The time of day at which the blood samples are taken is important. Recent investigators have shown that there occurs a marked variation in the total number of white cells and neutrophiles during a single day. The relative number of the other types of cells are as a result altered. Sabin and her coworkers (13), in 1925, showed that there occurs a variation in the total number of white blood cells in a proportion of 2 to 1 in the same individual in 12 hours. The maximum number is observed in the afternoon and the entire increase is the result of an increase in the number of the neutrophilic leucocytes. This increase occurs without reference to the intake of food.

Shaw (12), in 1927, found that there occurs a day and a night tide during each 24 hours. The minimum counts occur between 10 and 11 a. m., and 9 and 11 p. m.—the maximum between 2 and 4 p. m., and 2 and 5 a. m. He observed that the neutrophilic curve consistently follows the curve of the total white cells. He also found no evidence, either qualitative or quantitative, for digestive leucocytosis.

Mauriac and Cabouat (14) examined samples of their own bloods and found the percentages of neutrophiles to vary from 47 to 73 in one, and 47 to 67 in the other in a single day.

These reports show the necessity in a study of the blood picture in relation to a disease process of making blood counts at a designated time of the day and comparing them with those made at approximately the same time.

THE WHITE BLOOD CELL PICTURE IN LEPROSY

It is evident from the review of the literature that but few studies on the blood cytology in leprosy have been made.

Leger (26), 1921, reporting on the blood findings in two cases of leprosy, found the elements practically unaltered. He is of the opinion that leprosy is a disease characterized by a mononuclear increase and by a tendency to the appearance of a moderate eosinophilia from time to time.

Wade (27), in 1926, stated that so far as is known, leprosy presents no very special feature as regards the ordinary laboratory findings, and that " the impression has been gained that the leucocyte counts are not entirely the same as in nonlepers; there seems to be a tendency to higher lymphocyte percentages."

Bargehr (28), 1926, reported on the examination of 130 cases of leprosy. He found that the total white cell count showed but little that is characteristic of the disease. The eosinophiles were increased above normal in 60 per cent of the cases. The neutrophiles were normal in the light cases and increased at the expense of the lymphocytes in the more severe cases.

De Marval (29) concluded from his study of 100 cases that the leucocytes were normal or subnormal; there occurred an eosinophilia, both relative and absolute; no change of importance in neutrophiles and lymphocytes; monocytes showed a mild degree of increase, both relative and absolute.

The study here reported is based on the white blood cell counts of 126 cases of leprosy. The patients were of both sexes and between 10 and 73 years of age, 92 per cent being over 15. Therefore, the group, as far as the blood studies are concerned, may be regarded as composed of adults. All specimens of blood were obtained between 10 and 11.30 in the morning. The differential counts were obtained by counting from 200 to 400 cells. No cases were included which showed evidences of some intercurrent disease. To make the study more instructive, the cases were divided into two groups, one group containing no cases during an acute or subacute leprous reaction, and one group containing cases during such reactions.

GROUP 1. SEVENTY-FIVE CASES WITHOUT SUBACUTE OR ACUTE REACTIONS

TABLE 8.—*White blood cell counts in 75 cases of leprosy not suffering with leprous reactions*

	Relative number		Absolute number	
	Average	Variation	Average	Variation
	Per cent	*Per cent*		
Total leucocytes			7,689	5,000-9,800
Neutrophiles	51.6	32 -74	4,358	2,059-6,560
Lymphocytes	35.9	16.5-58	2,800	950-5,108
Monocytes	4.3	1 -12	327	70- 984
Eosinophiles	2.8	0 -19.5		
Basophiles	.3	0 - 2.5		

Total leucocyte count.—The total numbers of leucocytes in these cases, with an average count of 7,689 and a variation of from 5,000 to 9,800, fall within the normal limits.

Neutrophiles and lymphocytes.—If the older standard were accepted for comparison this study would show that the lymphocytes were increased at the expense of the neutrophiles. With our present knowledge all that can be stated is that the numbers of these cells fall within the normal limits with a possible tendency for the neutrophiles more frequently to fall near the lower and the lymphocytes the upper normal limits. Twenty-one and three-tenths per cent of the cases had a percentage of neutrophiles under 50, and 25.3 per cent had a lymphocyte percentage of over 40.

Monocytes.[1]—No variation from normal was noted in the number of monocytes in this group of 75 cases. The average was 4.3 per cent, with a variation of 1 to 12. Only 4 per cent of the cases showed more than 8 per cent monocytes.

Eosinophiles.—One must bear in mind, in considering eosinophilia and leprosy, that an increase in the eosinophiles occurs in persons infested with various parasites, and that infestation with such parasites is common in many of the communities where leprosy prevails. The average per cent of eosinophiles for the 75 cases here studied was 2.8, with but 7 cases with more than 5 per cent. It may be concluded from this study that leprosy *per se* does not cause an increase in the number of eosinophiles in the circulating blood.

Basophiles.—There was nothing of significance noted in the number of basophiles.

[1] The term "monocytes" as employed in this paper includes both large mononuclear and transitional leucocytes.

In order to determine whether any variations in the cell counts were dependent upon the bacteriological findings, type of leprosy, degree of skin involvement, degree of activity, and the administration of chaulmoogra oil, the cases were classified and studied in such groups. The results are shown in Tables 9 and 10.

TABLE 9.—*The total leucocyte counts in various clinical groupings and in relation to bacteriological findings and to chaulmoogra-oil therapy*

	Average of counts	Variation in counts
46 bacteriologically positive	7,889	5,200-9,800
29 bacteriologically negative	7,337	5,200-9,800
25 dermal	7,624	5,200-9,800
25 neural	7,400	5,200-9,800
25 with slight skin involvement	7,690	5,200-9,800
25 with heavy skin involvement	7,644	5,200-9,200
25 clinically active	7,984	5,200-9,600
25 clinically quiescent	7,720	5,000-9,800
25 receiving chaulmoogra oil	7,876	5,000-9,800
25 receiving no chaulmoogra oil	7,916	5,800-9,800

TABLE 10.—*Differential white blood cell count in various clinical groupings and in relation to bacteriological findings and to chaulmoogra oil therapy*

	Neutrophiles				Lymphocytes				Monocytes			
	Relative per cent		Absolute		Relative per cent		Absolute		Relative per cent		Absolute	
	Average	Range	Average	Range	Average	Range	Average	Range	Average	Range	Average	Range
Total (75 cases)	56.1	32-74	4,358	2,059-6,560	35.9	16.5-58	2,800	950-5,108	4.3	1-12	334	70-984
Bacteriological.												
46 positive	55.7	37-67	4,392	2,600-6,566	36.0	25 50.5	2,964	1,890-4,747	4.2	1-12	332	70-730
29 negative	57.7	35-71.5	4,304	2,059-6,468	35.5	19-54.5	2,604	950-3,600	4.3	1.5-9	317	78-604
Type:												
25 dermal	55.6	37-67	4,442	2,600-5,781	37.5	24-50.5	3,009	2,025-4,747	3.6	1-7.5	280	82-735
25 neural	57.4	35.5-72	4,389	2,059-6,566	35.5	22-54.5	2,598	1,585-3,600	4.2	1-7.5	322	70-588
Skin involvement:												
25 extensive	54.7	32-74	4,135	5,200-9,200	36.8	16.5-58	2,792	1,320-5,108	4.5	1-12	342	92-984
25 slight	59	45.5-72	4,548	5,200-9,800	29.8	21-51	2,257	1,584-4,656	3.8	1-9	290	70-604
Activity:												
25 active	54.4	35.5-67	4,180	2,059-5,781	38.7	28-54.5	3,087	2,054-4,747	3.7	1-7.5	295	82-705
25 quiescent	57.5	40-71.5	4,497	2,800-6,566	35.4	19-50	2,699	950-3,738	4.5	2-9	342	132-608
Chaulmoogra therapy:												
25 E. E. C	57.9	38-71.5	4,670	3,263-6,468	35.1	19-49.5	2,751	950-4,356	4	1-9.5	309	78-730
25 no E. E. C	56.3	32-74	4,520	2,059-6,468	35.3	16.5 54.5	2,776	1,320-4,656	4.7	1-12	380	82-984

The blood picture of these cases of leprosy is remarkably similar to the blood pictures obtained by various observers on groups of normal adults. This similarity is shown in Table 11.

TABLE 11.—*A comparison of the blood pictures in 75 cases of leprosy and in normal adults*

Observer	Number examined	Average per cent of—				
		Neutrophiles	Lymphocytes	Monocytes	Eosinophiles	Basophiles
Author [1]	75 lepers	56.1	35 9	4.3	2.8	0.3
Fisher and Tsung (1)	75 Chinese	53.5	35.3	6.1	4 6	.4
Wallace (5)	40 whites	54.6	38 8	3.7	1.1	1.8
Fairley (6)	29 whites	54.5	39.1	4.5	1.5	.4
Stains, et al. (10)	100 whites	54.5	36.0	7.0	2.5	0
Shaw (12)	116 whites	53.2	36.8	6.7	2.5	.7
Chamberlain et al. (2)	50 Filipinos	52.2	29.9	4.6	10.6	.7
Do	72 whites	56.8	31.7	6.9	3.8	.8
Mehrtens (4)	100 whites	56.5	37.5	4.5	0.97	.52

[1] Present study.

Conclusions.—From the study of this group of 75 cases of leprosy, the following conclusions may be drawn: (1) The total number of leucocytes is normal; (2) the number of the various types of cells falls within the variations found in normal individuals; (3) there is no relation between the blood picture and the bacteriological findings, the type of the disease, the degree of skin involvement, the degree of clinical activity, and the administration of the ethyl esters of chaulmoogra oil.

GROUP 2. ONE HUNDRED AND TWENTY-SIX PATIENTS, SOME DURING LEPROUS REACTIONS

THE RELATION OF THE WHITE BLOOD CELL PICTURE TO CLINICAL PROGRESS

The blood counts were studied in relation to acute, subacute, and chronic leprous reactions; to steady and definite improvement; and to the state of apparent quiescence or arrest. While a truer conception of the blood picture is gained when the absolute numbers of the various types of cells are determined, the relative counts alone are satisfactory for the study of their relation to clinical changes. All specimens of blood were obtained between 10 a. m. and 11 a. m.

Acute leprous reaction.—The term "acute leprous reaction" used in this report is applied to that phase of the disease characterized by a temperature of 101° F., or over, accompanied by acute dermal or neural, or both dermal and neural, manifestations.

At the onset of an acute leprous reaction there occurs a relative neutrophilic leucocytosis, as in many acute infections. The lymphocytes are decreased and the monocytes are normal in number. The average numbers of these cells at the height of 10 acute reactions

were as follows: Neutrophiles, 80 per cent; lymphocytes, 15.8 per cent; and monocytes, 3.6 per cent.

As convalescence begins, or shortly before, the number of neutrophiles decreases and the number of lymphocytes increases; and as convalescence continues, this change in the proportion of these cells continues, and the lymphocytes, often reaching a higher number than before the reaction, may exceed the neutrophiles in number. At some time during convalescence there apparently occurs a temporary increase in the number of monocytes, the number again decreasing as convalescence continues.

TABLE 12.—*The relative number of neutrophiles, lymphocytes, and monocytes during acute leprous reactions*

Case	Type of cell	Stage of reaction					
		Before	At onset	At height	During convalescence		
2712	Neutrophiles	52.5	72	84	67	53	36
	Lymphocytes	35	17.5	10-14	22	38	54
	Monocytes	3	10	1.5-5	10	7	5
2378	Neutrophiles		77	82.5	60	55	45
	Lymphocytes		5	12	32.5	35	39.5
	Monocytes		18	5	5	6	13.5
2749	Neutrophiles	52		76	50	48	
	Lymphocytes	42		18	39.5	48	
	Monocytes	2.5		5.5	5.5	3	
2750	Neutrophiles			79	64.5	49.5	
	Lymphocytes			20.5	30.5	40.5	
	Monocytes			0.5	4	8.5	
2809	Neutrophiles			74	38	40	
	Lymphocytes			21	42.5	48	
	Monocytes			4	13	5	
2094	Neutrophiles			88	66	58	50
	Lymphocytes			9	26.5	37.5	43
	Monocytes			3	6	4.5	3
2898	Neutrophiles				47	45.5	26
	Lymphocytes				38.5	39.5	67.5
	Monocytes				6.5	8.5	4.5

The changes in the leucocyte picture occurring during acute reactions are tabulated in Table 12. Three of these cases are here described in detail:

Case 2712.—M. C. (Table 12, Chart 1). Previous to the onset of the reaction the leprous manifestation showed slight improvement, at which time the blood cell count was: Neutrophiles, 52.5 per cent; lymphocytes, 35 per cent, and the monocytes, 3 per cent. The onset of the reaction was sudden and characterized by edema of the hands and feet, the appearance of new erythematous nodular lesions over ears, face, and extremities, and a temperature of 101.6° F. The temperature reached the highest point of 105° F. on the fifth day. By the fourth day of the reaction the neutrophiles had increased to 72 per cent, the lymphocytes had decreased to 17.5 per cent, and the monocytes had increased to 10 per cent. As the reaction continued, the neutrophiles continued to increase until they reached 84.5 per cent, and the lymphocytes decreased to 10 per cent. As convalescence set in and continued the neutrophiles gradually decreased to 36 per cent and the lymphocytes increased to 54 per cent. During the first few days of the reaction the number of monocytes fluctuated and then remained for a period of two weeks between 1.5 and 5.5 per cent.

As convalescence began the number increased to 10.5 per cent and then decreased as convalescence continued.

Case 2094.—M. K. (Table 12, Chart 2). Following a normal parturition there developed an acute leprous reaction characterized by the appearance of

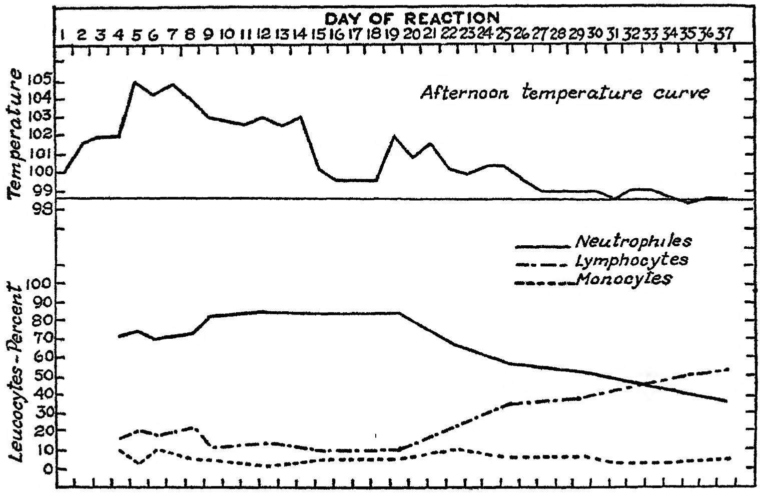


CHART 1.—(Case 2712) Changes in the relative number of neutrophiles, lymphocytes, and monocytes during an acute leprous reaction

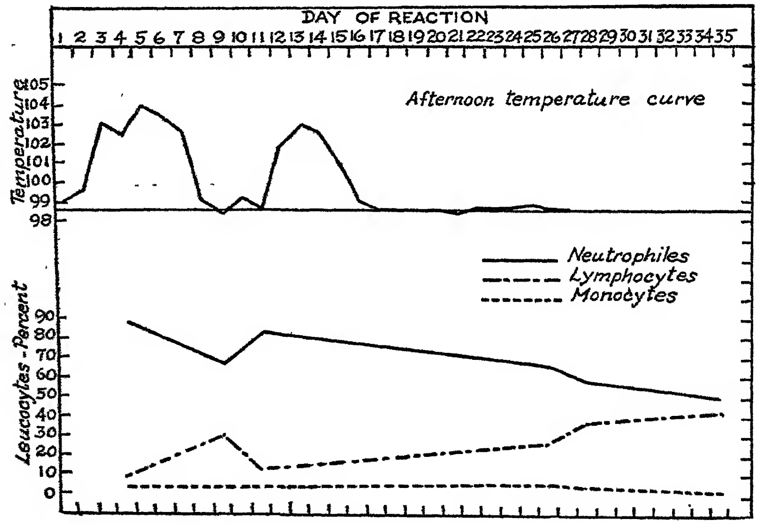


CHART 2.—(Case 2094) Changes in the relative number of neutrophiles, lymphocytes, and monocytes during an acute leprous reaction

new erythematous urticarial type of lesions over the extremities. The temperature on the third day reached 103° F., at which time the neutrophiles numbered 88, the lymphocytes 9, and the monocytes 3 per cent. On the fifth day the lesions began to retrogress and the fever to subside. On the eighth

day a new crop of lesions appeared, accompanied by a second febrile period with a blood count showing 82.5 per cent neutrophiles, 13 per cent lymphocytes, and 3.5 per cent monocytes. During the interval between the febrile periods the neutrophiles had decreased to 66.5 per cent and the lymphocytes had increased

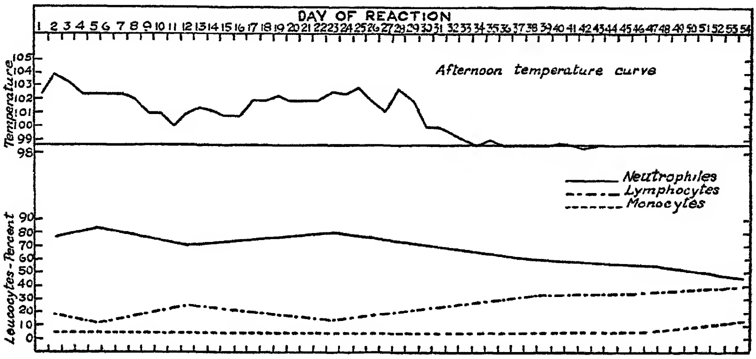


CHART 3.—(Case 2378) Changes in the relative number of neutrophiles, lymphocytes, and monocytes during an acute leprous reaction

to 30 per cent. On the twelfth day convalescence began and continued to recovery from the reaction.

Case 2898.—C. E. (Table 12). While on temporary release from segregation the disease reactivated, the reactivation occurring as an acute leprous reaction,

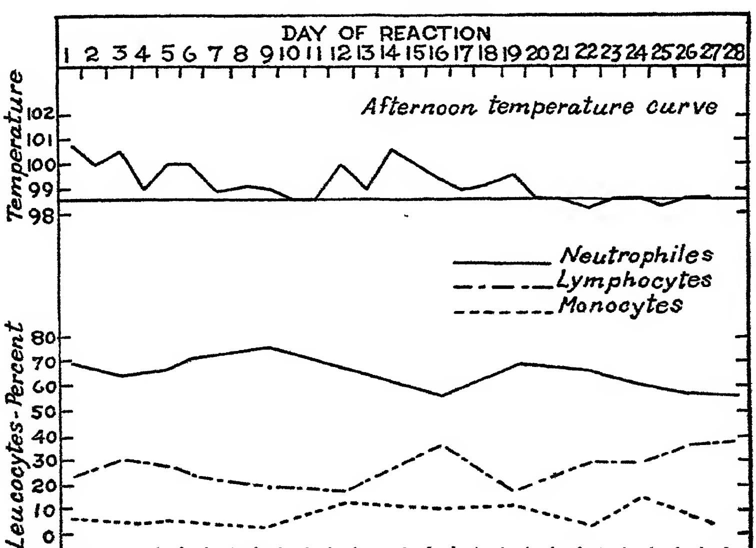


CHART 4.—(Case 2875) Changes in the relative number of neutrophiles, lymphocytes, and monocytes during a subacute leprous reaction

The patient was readmitted to the hospital during convalescence from the reaction, and the changes in the number of cells were similar to the others during convalescence from acute reaction.

Subacute reactions.—A subacute reaction is a change in the clinical progress of the disease characterized by the appearance of new, or the reactivation of existing, lesions accompanied by a moderate rise in temperature. The blood changes during this type of reaction are similar to, though less marked than, those occurring during an acute reaction. The average percentage of the blood cells during the height of six subacute reactions were: Neutrophiles, 70.8 per cent; lymphocytes, 24.7 per cent; and the monocytes, 3.3 per cent. This type of reaction is illustrated by the following case:

Case E. H. (Chart 4).—For three months there had occurred a slow progression in the disease characterized by an increase in nodulation, edema, and cyanosis. Following this period there occurred a generalized eruption accompanied by a febrile period of three weeks. Following the acute period there did not occur marked clinical improvement, the condition going on into the slow retrogression that took place previous to the reaction. As shown in Chart 4, the marked changes in the blood picture noted in the acute reactions were not seen.

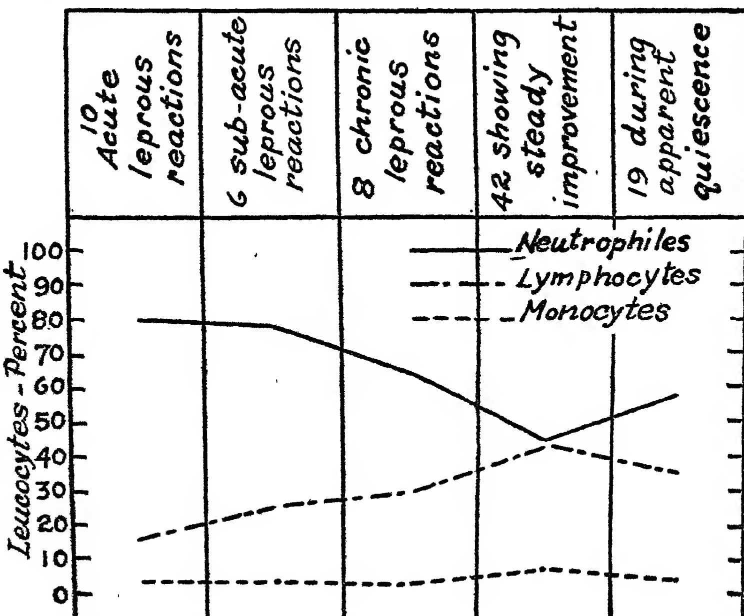


CHART 5.—A comparison of the average percentages of neutrophiles, lymphocytes, and monocytes in the various stages of clinical activity

Chronic reactions.—A chronic reaction is that type of clinical retrogression characterized by the frequent appearance of new lesions, accompanied by no, or but slight, elevation of temperature, and as a rule continuing over a period varying from a few weeks to months. This type of reaction is more common in those cases with definitely nodular lesions and may consist of the continued appear-

ance of new lesions or the development of frequent crops of lesions. The blood in eight such reactions has been studied and showed counts similar to those in the subacute reactions, the averages being: Neutrophiles, 65 per cent; lymphocytes, 29.2 per cent; and monocytes, 2.6 per cent.

Slow and definite improvement.—A large per cent of lepers in segregation, under changed environment and improved hygiene, show, for a time at least, a slow, steady improvement. At Kalihi Hospital it has been noted that most of the patients, regardless of the method of therapy, show a definite improvement during the first three or four months in segregation and many, following this preliminary period, continue to improve. It is in this type of case that the changes in the number of the white blood cells, relative to the clinical progress, are the most evident. The changes take place much more slowly than during the reactions and, therefore, by frequent examination, are generally detected. The average found in 61 examinations made on the blood of 42 patients during definite clinical improvement were: Neutrophiles, 45.6 per cent; lymphocytes, 43.7 per cent; and monocytes, 7 per cent. The changes noted in this type of case are tabulated in Table 13.

TABLE 13.—*Percentages of neutrophiles, lymphocytes, and monocytes during slow and definite improvement*

Case	Date	Neutrophiles	Lymphocytes	Monocytes
2879	Jan. 14, 1929	59.5	33.5	1.5
	May 8, 1929	36.5	52.5	7
	Aug. 9, 1929	30	57	9
2839	Oct. 24, 1928	52	39.5	4.5
	Apr. 29, 1929	29.5	49.5	16.5
	July 17, 1929	44	40	6
2888	Feb. 11, 1929	62.5	34.5	1
	Apr. 29, 1929	44	46	8.5
	Aug. 9, 1929	43.5	49.5	4.5
2891	Feb. 11, 1929	48.5	40	3.5
	Apr. 29, 1929	27	60	12
	Aug. 9, 1929	28.5	65	5.5
2874	Oct. 24, 1928	69.5	18.5	2.5
	June 17, 1929	57	35	4
	Aug. 9, 1929	43	43.5	7
2887	Feb. 13, 1929	56	41.5	1.5
	June 14, 1929	47	42.5	8.5
	Aug. 9, 1929	35	54.5	9
2856	Dec. 13, 1928	62.5	31.5	5
	Apr. 5, 1929	56.5	34.5	7.5
	June 14, 1929	45	43.5	10.5
2857	Apr. 1, 1929	47.5	45.5	4
	July 15, 1929	36.5	57	6
2858	Oct. 18, 1928	54	32	6
	Mar. 18, 1929	43	51	3
	May 8, 1929	53	52	13
	Aug. 9, 1929	24	66.5	8.5
2871	Feb. 21, 1929	59	37.5	2.5
	May 15, 1929	56	37	5.5
	Aug. 9, 1929	52	34.5	7
2866	Feb. 15, 1928	58	37.5	2
	Apr. 20, 1929	45	45	4.5
	May 6, 1929	42	42	9
	July 2, 1929	59	32	5

Clinical quiescence.—Differential white cell counts were made on the blood of 19 patients whose leprosy had become quiescent in so far as could be determined by clinical observation. The averages found in these cases were: Neutrophiles, 57.9 per cent; lymphocytes, 35.6 per cent, and monocytes, 4 per cent.

The white blood cells during five clinical stages of leprosy have been studied and a comparison of the results as shown in Table 14 and chart 5 has proved of interest. It will be noted that the curve is not unlike those illustrating the changes occurring during the reactions.

TABLE 14.—*A comparison of the average percentages of neutrophiles, lymphocytes, and monocytes in the various stages of activity*

Stage	Number of cases	Neutrophiles	Lymphocytes	Monocytes
		Per cent	*Per cent*	*Per cent*
Acute reactions	10	80	15.8	3.6
Subacute reactions	6	70.8	24.7	3.3
Chronic reactions	8	65	29 5	2.6
Slow definite improvement	42	45.6	43 7	7
Quiescence	19	57.9	35 6	4

Although in the majority of instances there occurred apparent agreement between the blood picture and the clinical progress, there were a few in which a disagreement was evident. In some, the blood counts were similar to those found in chronic or subacute reactions while clinically the leprous progress was stationary or improving. In most of these instances the blood findings were later confirmed by clinical developments.

Case 2533.—E. A. At the time of the first blood examination the clinical condition was that of improvement, which was also suggested by the blood count. At the end of a five-month period, during which time the apparent improvement continued, the blood picture was that of a subacute or chronic reaction. One week later the blood findings were confirmed by the appearance of a subacute reaction.

Case 2848.—U. B. At the time of examination the clinical condition was that of quiescence and bacteriologically negative, but the blood picture was that of retrogression. Three weeks later reactivation of the previous lesions occurred and lepra bacilli were demonstrated.

Case 2600.—I. N. For several months previous to the examination of the blood there had occurred definite clinical improvement; however, a blood count suggested retrogression. Three weeks after the examination of the blood clinical reactivation occurred.

Case 2741.—F. K. For several months previous to the examination of the blood the clinical progress had been classed as stationary to slight improvement. The blood count was: Neutrophiles, 66.5 per cent; lymphocytes, 26 per cent; and monocytes, 2 per cent, and suggested a chronic or subacute reaction. A short time after the examination new lesions appeared.

In these cases just discussed the blood counts predicted reactivation and reactions.

Case 2819.—T. H. At the time of the first examination of the blood the disease was apparently clinically quiescent, though bacteriologically positive in the nasal membrane, while the blood count of: Neutrophiles, 67 per cent; lymphocytes, 25 per cent; and monocytes, 6 per cent, suggested a reactionary phase. Three months later, when still clinically quiescent and after becoming bacteriologically negative, the blood count had changed to: Neutrophiles, 37.5 per cent; lymphocytes, 43.5 per cent; and monocytes, 8 per cent—counts agreeing with the clinical findings.

It is believed that in the five cases just discussed the blood counts gave a truer index as to the progress of the disease than did the clinical observations.

This study suggests that during the acute and active stages of leprosy there occurs a normal or increased number of neutrophiles, with a normal or decreased number of lymphocytes. As improvement begins, the neutrophiles decrease and the lymphocytes increase; and as improvement continues and goes to quiescence, the number of these two types of white blood cells approach normal. The monocytes, though the relation is less definite, alter in number with clinical changes.

Flin (30), from a study of the differential blood counts in active tuberculosis, found that the monocyte-lymphocyte and the lymphocyte-neutrophile ratios gave him a definite conception of the status and progress of his cases. It was believed, since there appears to be a definite relation between the neutrophile, lymphocyte, and monocyte numbers to the clinical progress of leprosy, that similar ratios might serve as an index of the progress of the disease. A number of cases, whose progress was felt to be fairly definitely known, were selected and studied to determine the possibility of such a relation. The group included cases during acute, subacute, and chronic reactions, definite clinical improvement, a state of clinical quiescence, and the state of apparent arrest. From such a study the following indications were determined.

A. Stationary to retrogression was indicated when—
   1. The neutrophile-lymphocyte ratio was 2:1 or over, and the lymphocyte-monocyte ratio was 10:1 or under, or when
   2. The neutrophile-lymphocyte ratio was 1:1 or over, and the lymphocyte-monocyte ratio was 10:1 or over.

B. Stationary to improvement was indicated when—
   1. The neutrophile-lymphocyte ratio was 1:1 or under, and the lymphocyte-monocyte ratio was 10:1 or over, or when
   2. The neutrophile-lymphocyte ratio was 2:1 or under, and the lymphocyte-monocyte ratio was 10:1 or under.

After determining this basis for comparison between the ratio index and the clinical progress, 264 determinations were made with the blood of 126 patients. Eighty-five and two-tenths per cent agreed with the clinical observations, 12.5 per cent disagreed, and

2.2 per cent were indefinite or border line. Later developments, either clinically or by blood cell changes, in those disagreeing, showed the ratios to be more significant as to the progress of the disease than did the clinical examinations.

PRACTICAL APPLICATIONS

This study suggests that the frequent examination of the blood has a practical value in the treatment of lepers:

(1) The examination of the white blood cells of a patient at the time of admission to a leprosarium for treatment will give an index as to the stage in the progress of the disease at that time.

It is hypothesized from clinical observations and histories obtained on the patients at Kalihi Hospital that leprosy runs a course marked by periods of activity and periods of quiescence. The periods of activity may vary in severity, frequency, and duration. Following a single period of activity the disease may go on to quiescence and arrest. Other cases may have a series of periods of acute activity with intervals of quiescence of varying length. Still others may show chronic activity over long periods of time.

A case of leprosy may be admitted for treatment at any time during the course of the disease. He may be admitted during the height, just previous to, or following a period of activity, or he may be admitted during a period of prolonged chronic activity. Occasionally a case is first detected during a quiescent period or arrest.

The examination of the blood in many instances will probably aid more in the determination of the stage of the disease on admission than will clinical observations alone. The blood of 23 individuals was examined at the time of admission to the hospital. Of these, 8 (or 34.7 per cent), as suggested by the blood counts, were in the stage of improvement when admitted. They have continued to improve since admission. The continued improvement has been shown by clinical observations as well as changes in the blood picture.

(2) A knowledge of the blood may aid in determining the value of any therapeutic agent or method of treatment. If, as suggested by this study, the blood examination gives an index as to the true progress of a disease, examination of the blood will, in many instances, show improvement in the progress of the disease, before a definite form of treatment is instituted. Too often is a therapeutic agent held responsible for clinical improvement in leprosy in cases which would have improved regardless of the treatment. If a blood examination will reveal that improvement in the progress of the disease is occurring before instituting a form of treatment, it will aid in determining the true value of a therapeutic agent.

(3) A blood examination may aid in predicting reactions or reactivations. In several instances, while this study was in progress,

the blood picture suggested a reactionary state while the clinical findings suggested continued improvement or quiescence. In many of these the blood findings were confirmed by clinical reactivation occurring shortly after the blood was examined. This may prove of special value in predicting reactivation in cases on temporary release (parole) from segregation.

(4) Repeated blood examinations may aid in the determination of fitness for release from segregation. If the blood picture gives an index of the stage in progress of the disease, the blood examination should, in conjunction with the clinical observations and bacteriological examinations, aid in determining fitness of a patient for parole.

SUMMARY

1. The white blood cell pictures of 75 uncomplicated cases of leprosy, not suffering with acute or subacute leprous reactions, were studied. The total leucocyte counts and the numbers of the different types of white cells were found to be within normal limits.

2. These cases were studied from the aspects of bacteriology, type of leprosy, degree of skin involvements, stage of activity, and chaulmoogra oil therapy. No apparent relation between these factors and the white blood cell picture was noted.

3. The blood pictures of 126 patients were studied in relation to the clinical progress of the disease. There were noted definite changes in the white blood cell picture correlating clinical changes. This study suggests that frequent examinations of the blood are of practical value in the treatment of leprosy; in determining the value of a therapeutic agent; in predicting leprous reactions and reactivation; and in determining the fitness of a patient for parole. The blood examinations, in addition to the bacteriological and clinical examinations, aid in the determination of the true progress of a patient.

REFERENCES

(1) Fisher, W., and Tsung, D. H.: Arch. f. Schiff u. Trop. Hyg., 1919, 23, 443.
(2) Chamberlain, W. P., and Vedder, E. B.: Philippine Jour. Sci., B. Med. Sc., 1911, 6, 405.
(3) Kop, W. A.: Leiden, 1920, p. 1.
(4) Mehrtens, H. G.: Arch. Int. Med., 1913, 12, 198.
(5) Wallace, J. B.: Southern Med. Jour., 1924, 13, 827.
(6) Fairley, K.: Med. Jour. Australia, 1923, 1, 655.
(7) Lippincott, L. L.: Jour. Lab. Clin. Med., 1926, 11, 524.
(8) Wickline, W. A.: Military Surgeon, 1908, 23, 282.
(9) Sweet, W. C.: Med. Jour. Australia, 1924, 2, 1.
(10) Stains, M. E., James, T. L., and Rosenberg, C.: Arch. Int. Med., 1924, 14, 376.
(11) Bunting, C. H.: Amer. Jour. Med. Sci., 1911, 142, 698.
(12) Shaw, A. F. B.: Jour. Path. Bac., 1927, 30, 1.

(13) Sabin, F. R., et al.: Bull. Johns Hopkins Hosp., 1925, 37, 14.
(14) Mauriac, P., and Cabouat, P.: Paris Medicale, 1921, 1, 407.
(15) Emerson, C. P.: Clinical Diagnosis, 1908.
(16) Simon, C. E.: Clinical Diagnosis, 1922.
(17) Green, L. R.: Medical Diagnosis, 1916.
(18) Starling, E. H.: Principals of Human Physiology, 1915.
(19) Stohr, P., and Lewis, F. J.: Stohr's Textbook of Histology, 1910.
(20) Wright, J. H.: Nelson's Medicine.
(21) Stitt, E. R.: Diagnosis and Treatment of Tropical Diseases, 1929.
(22) Schilling, V. (Gradwohl, B. H.): The Blood Picture, 1929.
(23) Roberts, E.: Jour. Path. Bac., 1925, 28, 119.
(24) Connal: Report of the Accra Laboratory for 1912, p. 22.
(25) Miller, S. R.: Bull. Johns Hopkins Hosp., 1914, 25, 317.
(26) Leger, M.: C. R. Soc. Biol., 1921, 84, 216.
(27) Wade, H. W.: Jour. Philippine Is. Med. Assoc., 1926, 6, 40.
(28) Bargehr, P.: Arch. f. Dermat. Syph., 1926, 152, 462.
(29) de Marval, L.: La Semana Medico, 1928, 35, 1034.

COURT DECISION RELATING TO PUBLIC HEALTH

Filled milk law held void.—(Illinois Supreme Court: People *v.* Carolene Products Co., 177 N. E. 698; decided June 18, 1931.) An Illinois statute provided as follows:

> SEC. 19½. No person shall manufacture, sell, or exchange, or have in possession with intent to sell or exchange, any milk, cream, skim milk, buttermilk, condensed or evaporated milk, powdered milk, condensed skim milk, or any of the fluid derivatives of any of them to which has been added any fat or oil other than milk fat, either under the name of said products or articles or the derivatives thereof or under any fictitious or trade name whatsoever.

The defendant company was charged with violating this statute, and an action in debt was brought by the State for the recovery of a penalty. The cause was submitted to the trial court upon an agreed statement of facts. This statement showed that the defendant manufactured and possessed a product called "Carolene"; that Carolene was composed of evaporated skimmed milk to which was added coconut oil, which oil was a fat other than milk fat; that neither the evaporated skimmed milk, the coconut oil, or the combination was harmful or deleterious to health in any way; that the product was manufactured in a sanitary manner and its possession was in no way dangerous to the public; that it had the general appearance of ordinary evaporated milk and was packed in 1-pound, air-tight tin cans bearing certain statements; that the use of coconut oil in oleomargarine was not prohibited by the laws of the State; and that Carolene was not intended to be sold by defendant to customers in the State. No question of imitation or fraud was involved and the wholesomeness of the product was admitted.

The trial court held the statute to be unconstitutional and the State appealed. The judgment of the trial court was affirmed by the supreme court, and the following are excerpts from the latter court's opinion:

The legislature has no authority to pronounce the performance of an innocent act criminal when the public health, safety, comfort, or welfare is not interfered with [case cited], and may not, under the guise of protecting the public interests, arbitrarily interfere with private business or impose unusual and unnecessary restrictions upon lawful occupations [case cited]. * * *

This court has by many decisions upheld the right of the citizen to engage in any occupation not detrimental to the public health, safety, and welfare, free from regulation by the exercise of the police power. [Cases cited.] The measures adopted by the legislature to protect the public health and secure the public safety and welfare must have some relation to these proposed ends. [Case cited.] Rights of property will not be permitted to be invaded under the guise of police regulation. [Case cited.] If it is manifest that the statute or ordinance, under the guise of a police regulation, does not tend to preserve the public health, safety, or welfare, it is void as an invasion of the property rights of the individual. [Cases cited.]

* * * * * * *

Under the facts admitted in this case, the legislature has exceeded its constitutional power in enacting the law in question. It is admitted that Carolene is not poisonous or explosive and that it does not injuriously affect the health, safety, or welfare of the people. Coconut oil is admitted to be a healthful substance and is the principal ingredient of oleomargarine. It is unreasonable to permit coconut oil to be freely used as the principal ingredient of oleomargarine by one manufacturer and prohibit its use in smaller proportions by another manufacturer of a food product admitted to be equally wholesome and healthful. No showing is made that such a restriction is justified to protect the public health or to prevent fraud. Section 19½ is arbitrary and unreasonable and is, therefore, a void enactment.

DEATHS DURING WEEK ENDED OCTOBER 31, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended October 31, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Oct. 31, 1931	Corresponding week, 1930
Policies in force	74, 425, 301	75, 382, 865
Number of death claims	11, 828	13, 628
Death claims per 1,000 policies in force, annual rate	8. 3	9. 4
Death claims per 1,000 policies, first 44 weeks of year, annual rate	9. 7	9. 6

Deaths [1] from all causes in certain large cities of the United States during the week ended October 31, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended Oct. 31, 1931				Corresponding week, 1930		Death rate [2] for the first 44 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,453	10.9	605	[4] 47	11.6	721	11.9	11.9
Akron	41	8.3	6	59	8.0	5	7.8	7.9
Albany [5]	38	15.3	2	40	16.3	2	13.9	14.7
Atlanta [6]	66	12.4	7	72	13.2	7	15.0	15.6
White	35	9.9	2	32	10.7	3	11.6	11.6
Colored	31	17.3	5	144	18.4	4	21.6	23.7
Baltimore [5 6]	205	13.1	27	91	15.6	32	14.3	13.9
White	151	11.8	17	74	13.9	22	13.0	12.7
Colored	54	19.2	10	156	23.6	10	20.1	19.9
Birmingham [6]	42	8.1	6	60	14.0	8	13.3	13.6
White	16	5.0	4	69	11.6	5	10.2	10.3
Colored	26	13.2	2	49	17.8	3	18.3	19.0
Boston	216	14.3	31	89	12.9	21	14.2	14.1
Bridgeport	25	8.9	3	50	8.2	1	11.0	10.9
Buffalo	126	11.3	13	53	13.8	17	13.0	13.0
Cambridge	21	9.6	2	40	9.6	2	12.1	11.9
Camden	33	14.5	4	70	17.1	5	14.1	13.5
Canton	21	10.3	1	23	6.9	1	10.0	10.0
Chicago [5]	620	9.3	41	30	10.3	51	10.6	10.4
Cincinnati	123	14.0	17	102	15.4	11	15.9	15.5
Cleveland	156	8.9	12	35	10.6	17	11.2	11.1
Columbus	78	13.8	10	98	14.8	6	13.5	15.5
Dallas [6]	59	11.3	7	--------	13.7	8	11.1	11.4
White	36	8.3	4	--------	14.6	7	9.7	10.4
Colored	23	25.3	3	--------	9.2	1	17.7	16.0
Dayton	49	12.4	8	112	9.5	1	11.9	10.7
Denver	73	13.0	3	29	15.5	2	13.9	14.8
Des Moines	29	10.5	2	35	11.7	4	11.1	11.7
Detroit	243	7.7	29	46	8.6	38	8.2	9.3
Duluth	17	8.7	2	49	16.4	2	11.1	11.4
El Paso	22	10.9	4	--------	15.7	5	15.4	17.2
Erie	22	9.7	1	19	10.8	3	10.4	11.2
Fall River [5 7]	17	7.7	2	45	10.0	0	11.1	11.8
Flint	13	4.1	8	102	9.6	4	6.9	9.2
Fort Worth [6]	28	8.7	1	--------	7.6	0	10.7	10.9
White	24	8.9	1	--------	7.6	0	10.3	10.3
Colored	4	7.7	0	--------	7.9	0	12.9	13.8
Grand Rapids	26	7.9	2	30	9.2	1	9.1	10.2
Houston [6]	59	9.9	11	--------	11.7	11	11.0	12.1
White	40	9.2	8	--------	10.3	8	10.2	10.7
Colored	19	11.9	3	--------	15.3	3	13.3	15.8
Indianapolis [6]	89	12.5	12	99	13.7	9	13.8	14.6
White	75	12.0	10	94	12.5	6	13.4	13.6
Colored	14	16.2	2	134	22.4	3	17.0	21.9
Jersey City	69	11.3	6	53	10.4	5	11.4	11.3
Kansas City, Kans.[6]	29	12.3	1	21	9.8	1	12.6	11.7
White	21	11.0	1	25	8.4	1	11.9	11.0
Colored	8	17.8	0	0	15.9	0	15.5	14.9
Kansas City, Mo	80	10.2	5	38	13.9	7	13.0	13.3
Knoxville [6]	18	8.6	0	0	8.3	3	12.2	13.5
White	13	7.4	0	0	7.6	3	11.4	12.7
Colored	5	14.6	0	0	12.1	0	16.6	17.8
Long Beach	36	12.3	0	0	7.6	3	9.8	9.9
Los Angeles	230	9.1	15	44	11.2	17	10.6	11.0
Louisville [6]	68	11.5	7	60	11.2	6	14.1	13.6
White	47	9.4	4	39	11.2	6	12.6	12.1
Colored	21	23.0	3	199	11.0	0	22.0	21.4
Lowell [7]	25	12.9	1	25	10.9	1	12.8	13.4
Lynn	18	9.1	1	26	9.2	2	9.4	10.4
Memphis [6]	81	16.3	6	63	17.0	11	16.6	17.0
White	45	14.7	4	67	13.3	4	13.6	13.2
Colored	36	19.0	2	58	23.1	7	21.5	23.2
Miami [6]	19	8.8	1	25	5.6	2	11.7	10.9
White	15	9.0	1	35	4.9	2	10.8	9.6
Colored	4	8.2	0	0	8.3	0	14.9	15.4

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended October 31, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Oct. 31, 1931				Corresponding week, 1930		Death rate [2] for the first 44 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	73	6.5	11	48	8.5	8	9.2	9.6
Minneapolis	97	10.7	10	64	12.0	17	11.2	10.7
Nashville [6]	52	17.4	8	119	15.6	7	16.8	16.5
White	36	16.7	6	120	14.1	4	14.3	13.9
Colored	16	19.5	2	118	19.4	3	23.5	23.4
New Bedford [7]	28	13.0	2	53	13.0	1	12.1	11.0
New Haven	54	17.3	1	19	15.1	1	12.5	12.7
New Orleans [6]	122	13.6	12	66	17.2	19	16.7	17.4
White	64	10.0	9	74	13.8	12	13.6	14.3
Colored	58	22.5	3	49	25.7	7	24.5	25.0
New York	1,415	10.4	95	40	10.7	122	11.1	10.8
Bronx Borough	201	7.9	8	18	8.6	18	8.2	7.9
Brooklyn Borough	476	9.4	45	48	9.3	47	10.2	9.8
Manhattan Borough	565	16.2	28	48	16.0	47	16.8	16.0
Queens Borough	141	6.4	11	30	6.2	10	7.2	7.0
Richmond Borough	32	10.2	3	54	10.5	0	13.6	14.2
Newark, N. J	92	10.8	9	47	10.8	5	11.6	12.0
Oakland	54	9.6	2	26	12.6	7	10.5	11.0
Oklahoma City	30	7.9	3	41	7.2	2	10.7	10.7
Omaha	52	12.5	4	45	12.9	5	13.8	13.5
Paterson	50	18.8	0	0	14.3	3	13.3	12.2
Peoria	20	9.6	1	26	11.8	3	12.6	12.2
Philadelphia	430	11.4	26	38	12.9	52	13.0	12.6
Pittsburgh	200	15.4	13	45	14.0	18	14.4	13.8
Portland, Oreg	67	11.4	2	24	11.2	0	11.6	12.1
Providence	52	10.6	0	0	10.5	4	12.7	12.8
Richmond [6]	45	12.7	5	73	17.1	10	15.5	14.8
White	23	9.1	2	44	11.2	2	13.0	12.1
Colored	22	21.7	3	130	31.5	8	21.6	21.5
Rochester	67	10.5	5	46	11.1	2	11.9	11.5
St. Louis	190	12.0	11	37	13.6	13	15.0	14.1
St. Paul	45	8.5	6	62	8.8	2	10.6	10.1
Salt Lake City [5]	20	7.3	2	30	15.2	7	12.1	12.3
San Antonio	49	10.6	3	--------	10.5	6	14.3	16.2
San Diego	36	12.0	1	20	12.2	2	13.4	14.3
San Francisco	183	14.7	5	33	9.1	2	13.1	12.9
Schenectady	25	13.6	1	29	11.4	2	10.6	11.2
Seattle	82	11.5	2	19	11.9	9	11.3	10.8
Somerville	15	7.4	0	0	6.5	1	8.8	9.7
South Bend	14	6.8	1	25	10.4	1	8.0	8.9
Spokane	29	13.0	0	0	15.3	3	12.3	12.5
Springfield, Mass	27	9.2	5	77	11.1	6	11.6	12.1
Syracuse	45	11.0	3	36	7.7	5	11.5	11.5
Tacoma	25	12.1	0	0	15.6	2	12.1	12.5
Toledo	58	10.2	6	55	12.3	10	11.9	12.7
Trenton	45	18.9	2	35	12.7	3	16.5	16.6
Utica	34	17.3	0	0	16.4	1	14.2	14.8
Washington, D. C.[6]	160	17.0	16	89	16.5	17	15.9	15.1
White	100	14.6	8	65	14.9	10	13.6	12.9
Colored	60	23.2	8	138	20.7	7	22.0	20.8
Waterbury	16	8.3	1	30	6.8	2	9.6	9.5
Wilmington, Del.[7]	26	12.7	2	43	12.7	5	13.9	14.4
Worcester	46	12.2	4	55	12.0	1	12.1	12.7
Yonkers	20	7.5	3	79	10.0	0	8.4	8.1
Youngstown	33	10.0	5	70	11.3	3	10.0	10.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 29; Richmond, 29; and Washington, D. C., 27.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

[These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers]

Reports for Weeks Ended November 7, 1931, and November 8, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 7, 1931, and November 8, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930
New England States:								
Maine	5	1	2		171	66	0	1
New Hampshire	8	1			15		0	0
Vermont	12	5			66	3	0	0
Massachusetts	61	67	4	2	62	78	6	3
Rhode Island	11	10		1	105		0	0
Connecticut	5	6	4	7	12	55	0	3
Middle Atlantic States:								
New York	68	74	[1] 5	[1] 11	145	71	8	12
New Jersey	34	62	5	16	19	71	1	2
Pennsylvania	104	132			205	109	4	4
East North Central States:								
Ohio	164	65	13	1	50	25	1	3
Indiana	94	55	1	2	74	28	0	3
Illinois	172	180	8	6	30	46	3	3
Michigan	63	85		3	21	40	7	4
Wisconsin	30	13	14	26	14	41	3	2
West North Central States:								
Minnesota	14	14	3		8	6	3	1
Iowa	10	16			5	2	3	1
Missouri	94	47	14	2	7	137	3	3
North Dakota	3	11			2	7	0	6
South Dakota	4	8			2		1	0
Nebraska	18	13	8		12	5	0	1
Kansas	112	10	3		24	3	0	1
South Atlantic States:								
Delaware	33	5					0	0
Maryland [2]	47	31	10	17	3	6	1	1
District of Columbia	13	9		1	1	3	0	1
Virginia								
West Virginia	95	36	22	11	106	26	1	0
North Carolina	237	154	25	8	60	9	2	2
South Carolina	39	63	289	498	17		0	0
Georgia [3]	56	26	57	67	5	3	1	0
Florida	32	22	1		7	6	0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 6 cases in Georgia and 2 cases in Alabama.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 7, 1931, and November 8, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930
East South Central States:								
Kentucky	219						1	5
Tennessee	151	57	31	35	3	3	2	2
Alabama [3]	134	34	9	27	4	28	1	3
Mississippi	104	92					0	2
West South Central States:								
Arkansas	82	21	17	12		4	0	0
Louisiana	36	45	10	23	15	1	1	1
Oklahoma [4]	109	62	21	28	4	10	0	2
Texas	84	94	11	69	11	8	1	0
Mountain States:								
Montana	2	1			71		0	1
Idaho	2	1				3	0	2
Wyoming		2			1		0	0
Colorado	4	14			4	215	0	0
New Mexico	21	6				7	0	1
Arizona	12	13		2		39	0	1
Utah [2]		3	4	10		3	0	0
Pacific States:								
Washington	13	22	4		38	5	1	3
Oregon	3	3	43	10	5	40	0	0
California	106	85	41	29	168	109	2	3

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930
New England States:								
Maine	5	5	32	18	0	0	5	7
New Hampshire	0	1	7	8	0	0	0	1
Vermont	4	0	11	6	22	3	0	0
Massachusetts	19	13	195	153	0	0	4	5
Rhode Island	0	0	16	15	0	0	0	2
Connecticut	17	2	27	32	0	0	4	9
Middle Atlantic States:								
New York	74	20	336	281	19	0	28	26
New Jersey	15	2	113	119	0	0	4	80
Pennsylvania	17	5	318	345	0	0	61	50
East North Central States:								
Ohio	4	43	335	288	11	15	39	41
Indiana	3	4	113	146	9	41	3	12
Illinois	33	19	287	339	19	25	14	15
Michigan	22	10	160	171	2	15	11	19
Wisconsin	23	7	71	86	0	6	3	5
West North Central States:								
Minnesota	30	26	41	53	2	10	0	3
Iowa	10	4	42	53	49	5	4	8
Missouri	3	8	92	99	3	11	13	34
North Dakota	3	3	10	20	12	19	5	4
South Dakota	2	5	6	6	2	13	2	3
Nebraska	0	12	26	20	3	15	2	0
Kansas	1	13	70	41	2	11	0	9
South Atlantic States:								
Delaware	0	0	7	10	0	0	2	1
Maryland [2]	2	2	78	43	0	0	30	21
District of Columbia	0	0	22	20	0	0	5	3
Virginia	2							
West Virginia	1	4	98	50	0	0	32	40
North Carolina	6	3	195	178	2	0	22	11
South Carolina	1	0	17	25	1	3	10	26
Georgia [3]	0	0	43	38	0	0	16	23
Florida	0	0	4	7	0	0	4	1

[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 6 cases in Georgia and 2 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 7, 1931, and November 8, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930	Week ended Nov. 7, 1931	Week ended Nov. 8, 1930
East South Central States:								
Kentucky	1	2	90	114	6	0	42	34
Tennessee	1	0	93	62	6	1	33	17
Alabama [3]	0	3	53	63	0	2	19	8
Mississippi	2	1	43	34	10	0	12	27
West South Central States:								
Arkansas	0	0	48	15	7	4	15	26
Louisiana	2	1	23	21	1	0	18	9
Oklahoma [4]	0	1	26	38	8	2	27	29
Texas	0	12	48	40	0	6	17	30
Mountain States:								
Montana	1	2	17	11	1	2	2	1
Idaho	0	0	4	10	0	0	1	3
Wyoming	0	0	5	4	0	0	0	0
Colorado	0	4	23	26	0	2	18	3
New Mexico	0	3	10	7	0	0	9	10
Arizona	0	0	9	5	1	0	5	3
Utah [2]	0	0	12	15	0	1	0	0
Pacific States:								
Washington	2	1	58	48	10	10	3	10
Oregon	0	1	16	17	5	6	4	2
California	3	49	123	107	7	9	5	18

[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 6 cases in Georgia and 2 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Small pox	Typhoid fever
September, 1931										
Arkansas	2	149		196	12	106	3	66	4	133
Kansas		46	3		28		0	99	4	38
Montana		11	5	1	43		20	33	3	23
October, 1931										
Arizona	2	26	26	3	3		4	22	1	17
Connecticut	2	20	15		31		152	100	0	17
District of Columbia	2	63	1		5	3	5	55	0	13
Georgia	1	232	66	311	19	44	0	127		147
Massachusetts	8	196	32	2	173	3	234	682	0	35
Nebraska		81	4		5		6	73	10	6
Tennessee	13	802	66	426	16	53	10	359	13	247
Vermont		9			78		25	21	20	2

September, 1931

	Cases
Actinomycosis:	
Kansas	1
Chicken pox:	
Arkansas	6
Kansas	35
Montana	31
Dysentery:	
Kansas	1
German measles:	
Kansas	4
Hookworm disease:	
Arkansas	1
Impetigo contagiosa:	
Kansas	18
Montana	1
Mumps:	
Arkansas	14
Kansas	57
Montana	1
Ophthalmia neonatorum:	
Arkansas	1
Paratyphoid fever:	
Arkansas	1
Kansas	3
Rocky Mountain spotted or tick fever:	
Kansas	1
Scabies:	
Kansas	11
Septic sore throat:	
Kansas	1
Tetanus:	
Kansas	2
Trachoma:	
Arkansas	2
Montana	24
Undulant fever:	
Kansas	3
Vincent's angina:	
Kansas	8
Whooping cough:	
Arkansas	14
Kansas	51
Montana	40

October, 1931

	Cases
Actinomycosis:	
Massachusetts	1
Anthrax:	
Massachusetts	1
Chicken pox:	
Arizona	50
Connecticut	30
District of Columbia	6
Georgia	12
Massachusetts	208
Nebraska	71
Tennessee	15
Vermont	46
Conjunctivitis, infectious:	
Connecticut	1
Dysentery:	
Arizona	1
Connecticut (bacillary)	5
Georgia	19
Dysentery—Continued.	
Massachusetts	1
Tennessee	12
German measles:	
Connecticut	5
Massachusetts	36
Tennessee	1
Impetigo contagiosa:	
Tennessee	4
Lead poisoning:	
Massachusetts	5
Lethargic encephalitis:	
Arizona	1
Connecticut	1
Massachusetts	1
Mumps:	
Arizona	3
Connecticut	44
Georgia	9
Massachusetts	203
Nebraska	35
Tennessee	32
Vermont	25
Ophthalmia neonatorum:	
Massachusetts	82
Paratyphoid fever.	
Connecticut	4
Georgia	5
Massachusetts	1
Tennessee	5
Puerperal septicemia:	
Tennessee	2
Rabies in animals:	
Connecticut	3
Septic sore throat:	
Connecticut	8
Georgia	37
Massachusetts	17
Nebraska	4
Tennessee	15
Tetanus:	
Connecticut	2
Massachusetts	9
Trachoma:	
Arizona	25
Connecticut	1
Massachusetts	3
Tennessee	2
Trichinosis:	
Massachusetts	1
Typhus fever:	
Georgia	17
Undulant fever:	
Arizona	3
Nebraska	1
Vincent's angina:	
Tennessee	3
Whooping cough:	
Arizona	14
Connecticut	196
District of Columbia	52
Georgia	15
Massachusetts	323
Nebraska	38
Tennessee	189
Vermont	123

Cases of Certain Communicable Diseases Reported for the Month of July, 1931, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	45	8	64	55	35	0	54	4	55
New Hampshire	-------	2	-------	-------	12	0	-------	2	-------
Vermont	34	1	111	43	35	43	21	0	74
Massachusetts	370	168	965	270	482	0	672	37	520
Rhode Island	7	30	378	56	47	0	60	1	43
Connecticut	87	37	410	75	65	0	146	11	323
New York	919	398	3,660	669	684	37	1,626	88	2,029
New Jersey	324	91	771	129	244	1	455	22	1,536
Pennsylvania	691	233	2,520	639	728	2	725	90	1,468
Ohio	288	74	1,080	427	295	104	631	81	-------
Indiana	42	45	274	14	116	159	229	23	337
Illinois	361	299	1,780	274	444	123	964	81	1,365
Michigan	343	93	541	222	462	39	484	19	1,370
Wisconsin	504	36	1,073	791	125	16	224	23	849
Minnesota	115	15	168	-------	88	4	345	11	184
Iowa	46	10	38	30	66	110	35	7	114
Missouri	28	57	102	37	81	28	255	100	532
North Dakota	8	15	26	10	17	36	12	2	31
South Dakota	20	13	6	8	22	8	26	17	36
Nebraska	46	9	4	79	15	27	31	10	36
Kansas	33	30	60	149	54	68	99	42	146
Delaware	-------	-------	96	3	-------	-------	13	-------	39
Maryland	72	36	306	57	72	1	306	63	433
District of Columbia	24	27	38	-------	24	0	84	6	139
Virginia	71	46	234	-------	71	12	170	251	489
West Virginia	29	13	235	-------	29	7	49	73	252
North Carolina	42	60	513	-------	83	1	-------	233	734
South Carolina	56	41	172	53	8	1	126	353	210
Georgia	21	15	68	39	42	-------	154	252	49
Florida	5	27	65	9	12	0	64	39	42
Kentucky [1]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Tennessee	17	12	158	18	43	27	160	199	215
Alabama	12	34	113	21	39	22	436	120	81
Mississippi	193	45	55	75	18	60	122	205	378
Arkansas	16	9	12	24	9	25	[2] 21	155	42
Louisiana	6	63	3	6	22	14	[2] 175	221	18
Oklahoma [3]	8	23	10	6	33	42	46	123	49
Texas	-------	69	-------	-------	83	-------	-------	135	-------
Montana	34	2	54	2	22	8	62	14	58
Idaho	10	4	15	5	17	8	[2] 13	2	8
Wyoming	8	1	13	4	10	4	[2] 1	3	35
Colorado	51	27	50	58	29	7	58	26	170
New Mexico	18	8	20	25	3	3	83	17	15
Arizona	11	7	18	0	5	0	60	16	2
Utah [1]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Nevada	0	1	27	0	2	0	[2] 6	3	9
Washington	99	24	87	52	43	60	158	19	321
Oregon	44	10	44	83	21	49	46	18	56
California	316	233	936	326	210	43	1,023	87	820

[1] Reports received weekly.
[2] Pulmonary.
[3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 100,000 Population (Annual Basis) for the Month of July, 1931

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	66	12	94	81	51	0	79	6	81
New Hampshire	--------	5	--------	--------	30	0	--------	5	--------
Vermont	111	3	363	140	114	140	69	0	242
Massachusetts	101	46	264	74	132	0	184	10	142
Rhode Island	12	51	638	95	79	0	101	2	73
Connecticut	63	27	295	34	47	0	105	8	233
New York	84	36	335	61	63	3	149	8	136
New Jersey	92	26	219	37	69	0	129	6	436
Pennsylvania	84	28	305	77	88	0	88	11	177
Ohio	50	13	188	74	51	18	110	14	--------
Indiana	13	16	98	5	42	57	82	8	121
Illinois	55	45	270	42	67	19	146	12	207
Michigan	81	22	128	52	109	9	114	4	324
Wisconsin	199	14	424	313	49	6	89	9	336
Minnesota	52	7	77	--------	40	2	157	5	84
Iowa	22	5	18	14	31	52	17	3	54
Missouri	9	18	33	12	26	9	82	32	171
North Dakota	14	26	45	17	29	62	21	3	53
South Dakota	34	22	10	13	37	13	44	29	61
Nebraska	39	8	3	67	13	23	26	8	31
Kansas	21	19	37	93	34	42	62	26	91
Delaware	--------	--------	470	15	--------	--------	64	--------	191
Maryland	51	26	218	41	51	1	218	45	308
District of Columbia	57	64	91	--------	57	0	201	14	332
Virginia	34	22	113	--------	34	6	82	121	236
West Virginia	19	9	157	--------	19	5	33	49	168
North Carolina	15	22	186	--------	30	0	--------	85	266
South Carolina	38	28	116	36	5	1	85	238	142
Georgia	8	6	28	16	17	--------	62	102	20
Florida	4	21	50	7	9	0	49	30	32
Kentucky [1]	--------	--------	--------	--------	--------	--------	--------	--------	--------
Tennessee	8	5	70	8	19	12	71	88	96
Alabama	5	15	50	9	17	10	191	53	36
Mississippi	112	26	32	43	10	35	71	153	219
Arkansas	10	6	8	15	6	16	[2] 13	98	26
Louisiana	3	35	2	3	12	8	[2] 96	122	10
Oklahoma [3]	4	13	6	3	19	24	26	69	28
Texas	--------	14	--------	--------	16	--------	--------	27	--------
Montana	74	4	118	4	48	18	136	31	127
Idaho	26	11	40	13	45	21	[2] 34	5	21
Wyoming	41	5	67	21	51	21	[2] 5	15	180
Colorado	57	30	56	65	33	8	65	29	191
New Mexico	49	22	55	68	8	8	227	46	41
Arizona	29	18	47	0	13	0	158	42	5
Utah [1]	--------	--------	--------	--------	--------	--------	--------	--------	--------
Nevada	0	13	343	0	25	0	[2] 76	38	114
Washington	73	18	64	39	32	44	117	14	238
Oregon	53	12	53	100	25	59	56	22	68
California	63	46	185	64	42	9	202	17	162

[1] Reports received weekly.
[2] Pulmonary.
[3] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 94 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,170,000. The estimated population of the 88 cities reporting deaths is more than 31,705,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended October 31, 1931, and November 1, 1930

	1931	1930	Estimated expectancy		1931	1930	Estimated expectancy
Cases reported				*Cases reported*—Con.			
Diphtheria:				Smallpox:			
46 States	2,503	1,795	----------	46 States	164	232	----------
94 cities	542	561	865	94 cities	7	20	13
Measles:				Typhoid fever:			
45 States	1,048	1,499	----------	46 States	770	697	----------
94 cities	236	347	----------	94 cities	101	87	89
Meningococcus meningitis:				*Deaths reported*			
46 States	53	92	----------				
94 cities	22	34	----------	Influenza and pneumonia:			
Poliomyelitis:							
46 States	381	505	----------	88 cities	529	642	----------
Scarlet fever:				Smallpox:			
46 States	3,208	2,983	----------	88 cities	0	0	----------
94 cities	890	1,011	759				

City reports for week ended October 31, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	1	1	0	----------	0	1	0	4
New Hampshire:								
Concord	0	0	0	----------	0	0	0	1
Nashua	0	1	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Burlington	1	1	0	----------	0	4	0	0
Massachusetts:								
Boston	10	24	12	5	1	4	8	15
Fall River	5	3	4	----------	0	2	1	3
Springfield	2	4	1	----------	0	1	2	0
Worcester	2	6	0	1	0	1	57	4
Rhode Island:								
Pawtucket	0	0	1	----------	0	0	0	0
Providence	5	7	7	----------	0	39	3	6
Connecticut:								
Bridgeport	0	4	0	1	0	0	0	1
Hartford	----------	4	----------	----------	----------	----------	----------	----------
New Haven	0	1	0	----------	1	0	0	1
MIDDLE ATLANTIC								
New York:								
Buffalo	19	11	6	----------	0	1	4	13
New York	32	116	54	20	5	17	22	118
Rochester	1	3	1	----------	0	2	2	2
Syracuse	5	2	0	----------	0	3	0	3
New Jersey:								
Camden	0	7	2	----------	0	1	0	2
Newark	8	13	3	5	0	1	1	6
Trenton	1	2	1	----------	0	0	6	1

City reports for week ended October 31, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MIDDLE ATLANTIC—continued								
Pennsylvania:								
Philadelphia	12	52	11	1	4	5	5	33
Pittsburgh	46	23	13	1	1	37	35	36
Reading	10	2	0		0	0	0	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	5	11	4		2	0	0	9
Cleveland	47	34	4	4	0	10	36	7
Columbus	5	4	30		1	1	1	4
Toledo	20	8	5	2	2	0	1	5
Indiana:								
Fort Wayne	0	3	3		0	0	0	0
Indianapolis	28	11	7		2	1	19	8
South Bend	1	2	0		1	0	0	1
Terre Haute	3	2	4		0	0	0	0
Illinois:								
Chicago	36	100	48	6	3	10	3	53
Springfield	0	1	1		0	2	0	2
Michigan:								
Detroit	28	59	33		1	1	5	10
Flint	4	3	0		0	1	4	2
Grand Rapids	3	2	0		0	0	4	3
Wisconsin:								
Kenosha	6	1	0		0	1	1	0
Madison	0	1	3			0	6	
Milwaukee	35	13	1		0	2	23	3
Racine	4	2	0		0	0	5	0
Superior	1	0	0		0	0	8	2
WEST NORTH CENTRAL								
Minnesota:								
Duluth	1	0	0		0	0	1	0
Minneapolis	35	27	7		0	3	13	4
St. Paul	16	9	1		0	0	0	4
Iowa:								
Davenport	7	2	0			0	0	
Des Moines	0	2	1			0	0	
Sioux City		2						
Waterloo	3	0	0			1	0	
Missouri:								
Kansas City	3	8	9		0	0	1	5
St. Joseph	0	1	12		0	0	0	0
St. Louis	10	39	29			2	1	5
North Dakota:								
Fargo	0	0	0		0	0	1	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	14	0	0			31	0	
Sioux Falls	0	0	0			0	0	
Nebraska:								
Omaha	23	12	15		0	0	2	3
Kansas:								
Topeka	4	2	5		0	0	0	1
Wichita	6	2	8		0	0	2	3
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	1	0		0	0	0	2
Maryland:								
Baltimore	5	21	12	4	1	1	3	13
Cumberland	1	1	0		0	2	0	0
Frederick	0	0	0		0	0	0	0
District of Columbia:								
Washington	0	15	9		0	2	0	15
Virginia:								
Lynchburg	1	4	2		0	0	0	0
Norfolk	0	3	4	1	0	0	1	1
Richmond	0	22	14		0	0	0	4
Roanoke	0	4	11		0	0	0	0
West Virginia:								
Charleston	4	2	5		0	0	0	0
Wheeling	6	1	0		0	0	0	2
North Carolina:								
Raleigh		4						
Wilmington	0	1	2		0	0	0	1
Winston-Salem	0	6	7	1	0	0	4	2

City reports for week ended October 31, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
SOUTH ATLANTIC—continued								
South Carolina:								
Charleston	0	0	0	16	0	0	0	1
Columbia	1	2	1		0	0	0	3
Greenville	0	2	2		0	0	0	0
Georgia:								
Atlanta	0	10	6	5	1	0	0	11
Brunswick	0	1	0		0	0	1	1
Savannah	2	2	1	20	0	1	0	1
Florida:								
Miami	0	1	2		0	25	0	0
Tampa	0	2	4		0	0	0	0
EAST SOUTH CENTRAL								
Kentucky:								
Covington	2	1	1		0	0	0	5
Tennessee:								
Memphis	0	10	14		0	1	0	6
Nashville	1	3	6		0	0	0	2
Alabama:								
Birmingham	0	7	10		0	0	0	2
Mobile	0	2	1		1	0	0	1
Montgomery	0	3	3			3	5	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	1	4			0	0	
Little Rock	0	1	3		0	0	0	4
Louisiana:								
New Orleans	0	11	10		0	0	0	7
Shreveport	0	1	2		0	5	0	3
Oklahoma:								
Muskogee	0	6	2		0	0	1	0
Oklahoma City	0	5	14		0	0	0	1
Texas:								
Dallas	3	19	18		0	0	0	4
Fort Worth	0	8	8		0	0	0	0
Galveston	0	1	2		0	0	0	1
Houston	0	7	8		0	0	0	5
San Antonio	0	3	1		0	0	0	1
MOUNTAIN								
Montana:								
Billings	0	0	0		0	1	0	0
Great Falls	0	0	0		0	0	0	1
Helena	0	0	0		0	3	0	0
Missoula	0	1	0		0	1	0	0
Idaho:								
Boise		0						
Colorado:								
Denver	14	9	1		2	1	4	5
Pueblo	0	1	0		0	0	0	0
New Mexico:								
Albuquerque	2	0	2		0	0	0	0
Arizona:								
Phoenix	0	0	5		0	0	0	4
Utah:								
Salt Lake City	23	3	0		0	1	2	0
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	38	5	1			28	6	
Spokane	2	2	1			0	0	
Tacoma	4	4	5		0	0	0	0
Oregon:								
Portland	24	8	0	1	0	5	10	8
Salem	0	0	0	2	0	0	0	0
California:								
Los Angeles	15	31	36	30	0	5	5	7
Sacramento	0	2	3		0	24	0	3
San Francisco	29	13	1	7	1	7	2	9

City reports for week ended October 31, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	2	1	0	0	0	0	0	1	0	2	25
New Hampshire:											
Concord	1	0	0	0	0	0	0	0	0	0	10
Nashua	0	0	0	0	0	0	0	0	0	0	-------
Vermont:											
Barre	0	0	0	0	C	1	0	0	0	0	4
Burlington	0	0	0	0	0	0	0	C	0	0	7
Massachusetts.											
Boston	40	27	0	0	0	13	2	1	0	12	216
Fall River	2	1	0	0	0	0	0	0	0	0	17
Springfield	4	3	0	0	0	1	0	0	0	0	30
Worcester	9	16	0	0	0	0	0	0	0	10	46
Rhode Island.											
Pawtucket	1	0	0	0	0	0	0	0	0	0	12
Providence	6	6	0	0	0	4	1	0	0	2	52
Connecticut:											
Bridgeport	5	2	0	0	0	1	1	0	0	0	25
Hartford	3	-------	0	-------	-------	-------	0	-------	-------	-------	-------
New Haven	2	3	0	0	0	1	0	0	0	2	54
MIDDLE ATLANTIC											
New York:											
Buffalo	16	25	0	0	0	13	1	0	1	15	122
New York	62	67	0	0	0	95	18	15	3	116	1,415
Rochester	4	27	0	0	0	1	1	0	0	2	66
Syracuse	4	4	0	0	0	0	0	0	0	11	45
New Jersey:											
Camden	2	11	0	0	0	3	0	0	0	1	33
Newark	8	13	0	0	0	13	2	0	0	60	100
Trenton	1	3	0	0	0	1	1	0	0	1	45
Pennsylvania.											
Philadelphia	45	82	0	0	0	28	7	4	1	156	430
Pittsburgh	33	51	0	0	0	11	1	6	1	16	200
Reading	1	0	0	0	0	0	0	0	0	0	25
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	14	41	0	0	0	9	0	3	0	5	123
Cleveland	21	32	0	0	0	9	1	16	2	96	156
Columbus	8	17	0	0	0	2	2	1	0	0	78
Toledo	9	9	1	1	0	1	1	0	0	23	58
Indiana:											
Fort Wayne	1	0	1	0	0	2	1	1	0	0	26
Indianapolis	12	5	1	1	0	2	1	1	0	4	-------
South Bend	3	1	0	0	0	1	0	0	0	0	14
Terre Haute	2	1	0	0	0	0	1	0	0	1	19
Illinois:											
Chicago	74	89	1	0	0	40	4	1	0	111	620
Springfield	2	6	0	0	0	0	0	0	0	4	20
Michigan:											
Detroit	61	38	1	0	0	17	2	1	0	69	243
Flint	10	6	0	0	0	0	0	2	0	1	13
Grand Rapids	8	4	0	0	0	1	0	0	0	3	26
Wisconsin:											
Kenosha	2	4	0	0	0	0	1	0	0	0	5
Madison	3	0	1	0	-------	-------	0	0	-------	1	-------
Milwaukee	15	16	0	0	0	3	0	0	0	91	73
Racine	2	5	0	0	0	0	0	0	0	5	11
Superior	2	0	0	0	0	0	0	0	0	0	9
WEST NORTH CENTRAL											
Minnesota:											
Duluth	8	0	0	0	0	0	0	0	0	0	17
Minneapolis	34	6	0	0	0	2	1	0	0	7	97
St. Paul	16	6	1	0	0	2	0	2	0	3	53
Iowa:											
Davenport	0	1	0	1	-------	-------	0	0	-------	0	-------
Des Moines	6	5	0	0	-------	-------	0	0	-------	0	29
Sioux City	2	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Waterloo	3	0	0	0	-------	-------	0	1	-------	11	-------

City reports for week ended October 31, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL—contd.											
Missouri:											
Kansas City	11	21	0	0	0	0	1	1	0	8	80
St. Joseph	2	3	1	0	0	0	0	0	0	0	--------
St. Louis	31	14	0	0	0	12	4	5	0	38	190
North Dakota:											
Fargo	2	7	0	0	0	0	0	0	0	4	--------
Grand Forks	2	0	0	0	--------	--------	0	0	--------	0	--------
South Dakota:											
Aberdeen	1	1	0	0	--------	--------	0	0	--------	8	--------
Sioux Falls	2	--------	0	--------	--------	--------	0	--------	--------	0	7
Nebraska:											
Omaha	4	6	0	0	0	1	0	1	0	1	52
Kansas:											
Topeka	4	1	0	0	0	0	1	0	0	1	8
Wichita	4	6	1	0	0	1	0	0	0	0	32
SOUTH ATLANTIC											
Delaware:											
Wilmington	3	4	0	0	0	0	0	2	2	3	26
Maryland:											
Baltimore	13	7	0	0	0	17	5	6	1	98	205
Cumberland	0	2	0	0	0	0	0	0	0	0	13
Frederick	0	0	0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	15	11	0	0	0	11	2	3	2	13	160
Virginia:											
Lynchburg	1	0	0	0	0	0	1	1	0	0	10
Norfolk	2	2	0	0	0	2	0	0	0	0	--------
Richmond	9	27	0	0	0	5	1	0	0	1	39
Roanoke	3	3	0	0	0	3	1	3	2	0	16
West Virginia:											
Charleston	2	3	0	0	0	0	1	0	0	1	14
Wheeling	2	3	0	0	0	1	0	0	0	0	20
North Carolina:											
Raleigh	1	--------	0	--------	--------	--------	0	--------	--------	--------	--------
Wilmington	1	2	0	0	0	1	0	0	0	6	13
Winston-Salem	3	2	0	0	0	2	0	0	0	9	16
South Carolina:											
Charleston	1	0	0	0	0	0	1	2	0	0	25
Columbia	1	4	0	0	0	1	0	0	0	1	25
Greenville	0	0	0	0	0	0	0	0	0	0	--------
Georgia:											
Atlanta	8	6	0	0	0	2	1	2	1	0	66
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	0	4	0	0	0	2	1	0	0	6	25
Florida:											
Miami	1	0	0	0	0	3	1	0	0	0	19
Tampa	0	0	0	0	0	1	0	0	0	3	22
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	3	0	0	0	0	0	0	0	1	20
Tennessee:											
Memphis	6	15	0	0	0	5	3	1	0	14	81
Nashville	2	3	0	0	0	2	2	0	0	3	52
Alabama:											
Birmingham	5	11	0	0	0	3	2	0	0	0	42
Mobile	1	0	0	0	0	1	0	0	0	0	24
Montgomery	0	2	0	0	--------	--------	0	0	--------	0	--------
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	1	0	0	--------	--------	0	0	--------	3	--------
Little Rock	2	5	0	0	0	2	1	0	0	0	6
Louisiana:											
New Orleans	5	0	0	0	0	9	2	5	1	4	122
Shreveport	0	2	0	0	0	2	0	0	0	3	35
Oklahoma:											
Muskogee	1	3	0	0	0	0	0	2	0	0	--------
Oklahoma City	2	0	0	0	0	1	1	4	0	0	30

City reports for week ended October 31, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL—contd.											
Texas:											
Dallas	6	4	0	0	0	2	1	0	0	7	59
Fort Worth	1	10	0	0	0	0	0	0	0	0	29
Galveston	0	0	0	0	0	0	0	0	0	0	10
Houston	2	2	1	0	0	3	0	0	0	0	59
San Antonio	1	0	0	0	0	4	1	0	0	0	49
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	4
Great Falls	1	2	0	0	0	0	0	0	0	2	9
Helena	0	0	0	0	0	0	0	0	0	0	7
Missoula	0	0	0	0	0	0	0	0	0	0	5
Idaho											
Boise	0		0				0				
Colorado:											
Denver	10	14	0	0	0	8	1	0	1	10	72
Pueblo	1	0	0	0	0	0	1	0	0	0	3
New Mexico:											
Albuquerque	1	1	0	0	0	3	0	0	0	0	8
Arizona:											
Phoenix	1	0	0	0	0	1	0	0	0	0	
Utah:											
Salt Lake City	2	3	0	0	0	1	2	0	0	1	20
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	7
PACIFIC											
Washington:											
Seattle	8	9	1	0			1	3		0	
Spokane	5	0	1	0			1	0		0	
Tacoma	3	1	2	0	0	0	0	0	0	4	25
Oregon:											
Portland	6	4	3	1	0	1	0	0	0	4	67
Salem	1	0	0	1	0	0	0	1	0	0	
California:											
Los Angeles	18	57	0	0	0	18	2	5	1	11	230
Sacramento	3	0	0	0	0	2	0	3	0	0	25
San Francisco	10	1	1	6	0	12	1	2	0	1	170

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	[1] 2	0
Massachusetts:									
Boston	1	0	1	0	0	0	2	12	2
Fall River	0	0	0	0	0	0	0	1	0
Springfield	0	0	0	0	0	0	0	2	0
Worcester	0	0	0	0	0	0	0	5	0
Rhode Island:									
Providence	0	0	0	0	0	0	1	2	0
Connecticut:									
Bridgeport	0	0	0	0	0	0	0	2	0
New Haven	1	0	0	0	0	0	0	3	0
MIDDLE ATLANTIC									
New York:									
New York	3	1	3	1	0	0	9	35	4
Rochester	0	0	0	0	0	0	0	1	0
New Jersey:									
Newark	0	0	0	0	0	0	0	5	0
Pennsylvania:									
Philadelphia	1	0	0	0	0	0	1	6	2
Pittsburgh	0	1	0	0	0	0	0	1	0

[1] Delayed report.

City reports for week ended October 31, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	1	0	0	0	0	0	0	0
Cleveland	1	1	0	0	0	1	1	1	0
Indiana:									
Indianapolis	1	0	0	0	0	0	0	0	0
Illinois:									
Chicago	2	1	0	0	0	0	3	7	1
Michigan:									
Detroit	4	0	0	0	0	0	2	3	0
Grand Rapids	0	0	0	0	0	0	0	1	0
Wisconsin:									
Milwaukee	0	0	0	0	0	0	0	1	0
Superior	0	0	1	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	1	1
Minneapolis	0	0	0	0	0	0	1	12	2
St. Paul	0	0	0	0	0	0	1	8	0
Missouri:									
St. Louis	0	0	0	0	0	0	0	1	0
North Dakota:									
Fargo	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	2	0	0	0	0	0	2	0	0
District of Columbia:									
Washington	0	0	0	0	1	1	1	1	0
Virginia:									
Lynchburg	0	0	0	0	0	0	0	1	0
South Carolina:									
Charleston	0	0	0	0	3	0	0	0	0
Georgia:									
Atlanta	0	0	0	0	1	1	0	0	0
Savannah [1]	0	0	0	0	4	0	0	0	0
Florida:									
Miami	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	0	0	0	0	0	1	0	1	0
Nashville	0	1	0	0	0	0	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	2	1	0	0	0
Oklahoma:									
Oklahoma City	0	1	0	0	0	0	0	0	0
Texas:									
Dallas [1]	0	0	0	0	1	0	1	0	0
Fort Worth	0	0	0	0	0	2	0	0	0
MOUNTAIN									
Colorado:									
Denver	0	0	0	0	0	0	1	1	0
Arizona:									
Phoenix	0	0	0	0	0	0	0	1	0
PACIFIC									
Washington:									
Tacoma	0	0	0	0	0	0	0	1	0
California:									
San Francisco	5	2	0	0	0	0	0	2	0

[1] Typhus fever, 5 cases: 4 cases at Savannah, Ga., and 1 case at Dallas, Tex.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended October 31, 1931, compared with those for a like period ended November 1, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, September 27 to October 31, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Oct. 3, 1931	Oct. 4, 1930	Oct 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct 18, 1930	Oct 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930
98 cities	56	60	65	70	70	70	[2] 82	77	[3] 85	90
New England	50	53	72	58	46	70	87	106	[4] 65	92
Middle Atlantic	25	40	40	40	34	33	32	34	41	44
East North Central	44	79	53	99	61	91	[2] 75	105	82	130
West North Central	90	60	99	68	128	76	145	66	[5] 169	93
South Atlantic	150	68	132	116	170	100	223	106	[6] 148	116
East South Central	140	102	221	96	233	143	122	179	204	293
West South Central	108	104	74	59	101	118	142	80	162	101
Mountain	78	9	36	44	52	18	35	62	[7] 9	35
Pacific	41	51	47	81	47	87	76	101	92	67

MEASLES CASE RATES

	Oct. 3, 1931	Oct. 4, 1930	Oct 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct 18, 1930	Oct 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930
98 cities	18	19	29	22	26	35	[2] 32	36	[3] 37	59
New England	24	36	137	34	70	48	180	75	[4] 125	138
Middle Atlantic	12	12	15	15	20	22	19	29	30	27
East North Central	12	5	13	11	13	14	[2] 18	16	18	18
West North Central	10	70	2	77	10	143	6	143	[5] 12	294
South Atlantic	2	22	6	12	14	8	10	14	[6] 12	20
East South Central	29	0	0	18	0	6	17	24	23	42
West South Central	17	7	27	0	10	3	24	3	17	0
Mountain	35	70	52	115	78	194	17	141	[7] 63	414
Pacific	78	22	106	20	96	57	69	18	125	24

SCARLET FEVER CASE RATES

	Oct. 3, 1931	Oct. 4, 1930	Oct 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct 18, 1930	Oct 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930
98 cities	65	71	99	95	101	120	[2] 127	121	[3] 140	161
New England	132	80	144	116	137	162	195	157	[4] 154	213
Middle Atlantic	51	46	76	51	74	85	100	78	127	132
East North Central	62	106	112	135	139	177	[2] 142	171	161	218
West North Central	94	72	86	93	94	116	119	116	[5] 138	163
South Atlantic	59	76	142	126	124	126	156	162	[6] 156	166
East South Central	70	66	233	161	70	132	145	149	198	245
West South Central	37	35	61	35	41	73	57	70	47	66
Mountain	96	115	139	291	44	238	174	167	[7] 172	344
Pacific	72	73	67	75	110	51	141	89	133	47

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] South Bend, Ind., not included.
[3] Hartford, Conn., Sioux City, Iowa, Raleigh, N. C., and Boise, Idaho, not included.
[4] Hartford, Conn., not included.
[5] Sioux City, Iowa, not included.
[6] Raleigh, N. C., not included.
[7] Boise, Idaho, not included.

Summary of weekly reports from cities, September 27 to October 31, 1931.—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Oct 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930
98 cities	0	1	1	2	1	2	[2] 2	2	[3] 1	3
New England	0	0	0	0	0	0	0	0	[4] 0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	0	1	0	2	0	4	[2] 0	2	1	1
West North Central	2	0	2	6	6	0	10	0	[5] 0	19
South Atlantic	0	2	4	0	0	0	4	0	[6] 0	0
East South Central	0	0	0	0	6	0	0	0	0	0
West South Central	0	3	0	3	0	3	3	7	0	3
Mountain	0	0	0	0	9	26	0	0	[7] 0	9
Pacific	0	0	10	6	2	0	12	18	12	14

TYPHOID FEVER CASE RATES

	Oct 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930
98 cities	21	20	20	20	18	16	[2] 22	17	[3] 16	14
New England	17	12	19	22	10	10	29	29	[4] 5	5
Middle Atlantic	21	14	15	14	16	10	24	12	11	9
East North Central	9	9	5	9	8	7	[2] 12	5	16	7
West North Central	13	14	11	10	33	15	19	8	[5] 20	14
South Atlantic	65	42	53	70	49	62	26	40	[6] 38	32
East South Central	52	60	64	42	52	42	105	84	6	102
West South Central	24	52	78	49	41	21	37	24	17	14
Mountain	26	115	35	44	9	35	17	79	[7] 0	0
Pacific	16	16	10	16	4	22	6	16	25	18

INFLUENZA DEATH RATES

	Oct 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930
91 cities	3	2	3	5	5	5	[2] 4	5	[8] 5	9
New England	2	0	2	5	2	7	2	2	[4] 5	2
Middle Atlantic	3	2	4	6	6	4	2	6	4	9
East North Central	2	1	2	3	2	4	[2] 3	3	6	6
West North Central	12	0	0	6	0	3	3	9	0	9
South Atlantic	0	2	0	2	0	6	10	4	[6] 4	18
East South Central	6	13	6	0	6	0	13	6	6	13
West South Central	0	11	7	11	14	7	17	7	0	21
Mountain	0	18	17	9	35	9	9	9	[7] 18	18
Pacific	0	2	5	0	5	7	7	7	2	2

PNEUMONIA DEATH RATES

	Oct 3, 1931	Oct. 4, 1930	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930
91 cities	53	58	55	71	64	72	[2] 69	86	[8] 82	99
New England	58	44	77	70	75	87	50	99	[4] 91	104
Middle Atlantic	60	59	56	74	63	70	78	102	96	109
East North Central	35	53	35	55	45	50	[2] 51	52	63	87
West North Central	59	69	56	87	100	54	91	60	75	96
South Atlantic	61	52	79	86	87	96	67	136	[6] 112	134
East South Central	63	104	69	123	69	162	95	84	101	65
West South Central	66	71	76	110	59	82	97	125	86	103
Mountain	61	132	35	97	87	194	78	79	[7] 54	167
Pacific	53	40	55	40	65	65	55	60	46	32

[2] South Bend, Ind., not included.
[3] Hartford, Conn., Sioux City, Iowa, Raleigh, N. C., and Boise, Idaho, not included.
[4] Hartford, Conn., not included.
[5] Sioux City, Iowa, not included.
[6] Raleigh, N. C., not included.
[7] Boise, Idaho, not included.
[8] Hartford, Conn., Raleigh, N. C., and Boise, Idaho, not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended October 24, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended October 24, 1931, as follows:

Province	Cerebrospinal fever	Dysentery	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]							
Nova Scotia			7		1		6
New Brunswick					2		2
Quebec Province	1				95		24
Ontario				1	8		47
Manitoba					1		11
Saskatchewan						11	4
Alberta					3	1	
British Columbia		8	6				3
Total	1	8	13	1	110	12	97

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended October 24, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended October 24, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Paratyphoid fever	1
Chicken pox	65	Poliomyelitis	95
Diphtheria	51	Scarlet fever	128
German measles	1	Tuberculosis	31
Measles	52	Typhoid fever	23
Mumps	12	Whooping cough	9
Ophthalmia neonatorum	2		

CHINA

Shansi and Shensi Provinces—Plague.—A telegram dated November 2, 1931, states that the Public Health Administration of China has received an appeal for more medical aid for districts on the Shansi-Shensi border where bubonic plague is present. Additional physicians and medical supplies were sent.

LATVIA

Communicable diseases—August, 1931.—During the month of August, 1931, cases of certain communicable diseases were reported in Latvia as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	3	Poliomyelitis	3
Diphtheria	44	Puerperal fever	12
Erysipelas	35	Scarlet fever	32
Influenza	91	Tetanus	2
Leprosy	1	Trachoma	67
Measles	5	Typhoid fever	170
Mumps	44		

TRINIDAD

Port of Spain—Vital statistics—September, 1930, 1931.—The following statistics for the months of September, 1930 and 1931, are taken from a report issued by the public health department of Port of Spain, Trinidad:

	1930	1931		1930	1931
Number of births	168	153	Death rate per 1,000 population	18.6	18.2
Birth rate per 1,000 population	30.4	27.1	Deaths under 1 year	15	29
Number of deaths	103	103	Deaths under 1 year per 1,000 births	89.3	189.5

YUGOSLAVIA

Communicable diseases—September, 1931.—During the month of September, 1931, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	146	15	Poliomyelitis	1	
Cerebrospinal meningitis	1	3	Rabies	1	1
Diphtheria	993	118	Scarlet fever	609	21
Dysentery	290	55	Sepsis	6	3
Erysipelas	227	5	Tetanus	26	13
Lethargic encephalitis		1	Typhoid fever	744	92
Measles	661	6	Typhus fever	3	1
Paratyphoid fever	15				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931					September, 1931				October, 1931					Nov 7, 1931
					1	8	15	22	29	5	12	19	26	3	10	17	24	31	
Ceylon: Colombo	C	1	1		1	1	1												
	D	1	1		1	1	1												
China:																			
Canton	C	2	1						1	1									
	D	1																	
Shanghai	C			1		1	5	1	1	58	30	36	35	29	17	17	8		
	D									3	4	2	5	8			4		
Swatow	C		10	7															
Tientsin	C	1	10																
	D	1	1																
India	C	13,604	18,001	22,074	7,357	9,848	9,817	9,492	10,734	9,834									
	D	7,270	10,337	12,093	4,029	5,584	5,411	5,252	6,044	5,518									
Bombay	C			23	9	18	6	11	27	5	5	5	1	1	2				
	D			16	4	9	7	5	9	5	2	1		1	2				
Calcutta	C	265	292	237	42	27	20	21	10	3	15	18	18	23	3	7			
	D	119	168	155	10	7	7	6	4	2	3	6	6	12		5			
Chittagong	C															1			
Karikal	C	12					1		1			1	1						
	D	7					1		1			1							
Madras	C	52	9	4	1		2	3	3	1	1								
	D	17	4																
Moulmein	C			1															
	D			1															
Negapatam	C								1										
Rangoon	C	2	4	4		1	1						1				1		
	D	1	2	1		1	1						1				1		
Vizagapatam	C		1																
India (French):																			
Chandernagor	C	4	3	5	1	4	2			1	1		1						
	D	4	3	1	1	4	2			1	1		1						
Pondicherry	C	17	3	3	1	1	1		2			2		1					
	D	7	3	3	1		1		1			1							

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	Nov. 7, 1931
India (Portuguese)	C		1	2		1		1	1	2	25	6							
	D			1		1		1	1	1	10	6							
Indo-China (see also table below):																			
Cochin-China—Rachgia	C				P														
Pnompenh	C		1	5		1		1			1	1		1					
	D	2	1	2		1					1	1		1					
Saigon and Cholon	C	104	61	11											1				
	D	76	41	7											1				
Iraq:																			
Abulkhasib	C								6										
	D								5										
Amara	C							2	22	35	8	1			2	2	2		
	D							1	21	30	7	1				1	1		
Amara Province	C								6	11	103	73	32	21	15	27	13	7	15
	D								5	4	67	41	29	24	11	17	10	6	8
Basra	C				3	9	263	272	148		51	91	77	19	29	32	38	30	9
	D				2	8	140	137	76		30	48	34	11	13	23	7	18	10
Basra Province	C							5	14	6	10	23	26	14	1	1	3	7	
	D							2	10	3	7	10	9	8	1	1	1	4	
Dinwaniyah	C												1						
Diwaniyah Province	C												15	8	14	21	22	1	
	D												11	6	5	22	10	5	
Iwaniyah	C												22						
	D												15						
Muntafiq Province	C								10	21	66	128	55	54	45	55	17	19	9
	D								8	20	42	75	38	57	28	37	10	18	6
Nasiriyah	C									22	50	16	4	4	18	7	4	7	6
	D									15	40	20	3	4	18	3	3	6	3
Suqelshuyukh	C								2										
	D								2										
Japan: Taiwan—Kelung	C																		2
Persia:[1] Rafsanjan[2]	C	36																	
	D	11																	
Philippine Islands:[3] Provinces—																			
Capiz	C	17	4							9	9	17	49	21	5	4		7	5
	D	15	4							5	6	5	35	16	5	3		5	4

Cebu	C					1	1	1											
	D					1	1	1											
Iloilo	C		23	27															
	D		21	25															
Negros, Occidental	C		2																
	D		1																
Pampanga	C	1																	
Siam	C	14	4	3				1	1										
	D	5	2	1					1										
Bangkok	C	3	1	4				1	1										
	D	1	1	2															
On vessel:																			
S. S. Arankola, at Rangoon, from Calcutta	C	1																	
S. S. City of Eastborne, at Calcutta from Cocanada	C		1																
S. S. Tairea, at Penang, from Calcutta	C		1																
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C			1															
	D			1															
S. S. Kohistan, at Basra, from Bushire, Persia	C			2															
S. S. Cathay, at Kobe, Japan, from Shanghai	C							4											
	D							1											
S. S. Kasagi Maru, at Moji, from Shanghai	C									1									
S. S. Ankoo, at Nagasaki, from Shanghai	C										2								
	D										1								

Place		March, 1931	April, 1931	May, 1931	June, 1931			July, 1931			August, 1931			September, 1931		
					1–10	11–20	21–30	1–10	11–20	21–31	1–10	11–20	21–31	1–10	11–20	21–30
Indo-China (French) (see also table above):																
Cambodia [4]	C	100	113	117	83	96	129	72	82	87	12				8	6
	D	29	70	63	45	64				60	2				4	3
Cochin-China [4]	C	105	107	174	71	69		66	30	47	39				9	9
	D	73	74	133	52	54				42	32				6	7

[1] On October 23, 1931, cholera was reported at Mohammerah, Abadan, and Ahwaz District, Persia. During two weeks ended November 2, 1931, 54 cases and 22 deaths were reported. Later advices say that the diagnosis of cholera was not confirmed upon bacteriological examination.

[2] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.

[3] Figures for cholera in the Philippine Islands are subject to correction.

[4] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	Nov. 7, 1931
Algeria:																			
Algiers	C				2														
Bone	C		1																
Philippeville	C			1			1	1											
	D			1			1												
Argentina: San Juan Province	C			P															
Belgian Congo	C		1																
	D		1																
British East Africa (see also table below):																			
Tanganyika	C	46	17	6			8					4	8						
	D	30	10	6			2					4	4						
Uganda	C	138	298	418	71	93	69	52	59	59	107								
	D	126	286	400	71	93	68	49	61	56	107								
Ceylon: Colombo	C	3	2	1	4	1	1			1	1	1	1	1	2				
	D	3	2	1	4	1	1			1	1	1	1	1	1				
Plague-infected rats		5			1	3	4												
China:[1]																			
Amoy	C	1																	
	D	1																	
Shansi Province[2]	C																	P	
Shensi Province	C																	P	
Dutch East Indies:																			
Batavia and West Java	C	59	116	75	12	11	20	15	19	18	8	20							
	D	59	66	75	12	11	20	15	19	18	8	20							
East Java and Madura	C	1																	
	D	1																	
Java and Madura	D	176	192	212	38	53	67	47	58	68	51	56	77	69					
Egypt:																			
Alexandria	C		4	13	4	3	1	1	2	2		1	1				1	1	8
	D		4	5	1	2			1	1									1
Assiout	C	18	11																
	D	7	1																
Beni-Suef	C	5																	
	D	3																	

Beheira	C				1		1			2									
Dakahlia	C			1		2													
Deirout	C	10	3																
	D	4	1																
Gharbieh	C		1																
	D		1																
Girga	C	7		1															
	D	2																	
Kena	C	1																	
	D	1																	
Minieh	C	6	3	12															1
	D	3	1	4															1
Port Said	C		3	5	2												1		
	D	1	2	1															
Tanta	C						2			1		1							
France: Rouen-Devilleles	C																	P	
Hawaii Territory:																			
Hawaii—Hamakua—Plague-infected rats		1					1												
Maui Island—																			
Halimaile—Plague-infected rats												1							
Kula District	C					1													
	D					1													
Makawao—Plague-infected rats												1							
Paia—Plague-infected rats													1						
India	C	752	88	221	164	175	130	215	282	337									
	D	602	51	128	94	117	92	137	146	179									
Bassein	C	1		4		1		1		1	2	1	1				1		
	D	1		3		1		1		1	2	1	1				1		
Bombay	C	8		12											1				
	D	6		6											1				
Plague-infected rats		94	37	48	8	13	17	9	23	17	7	10	9	9	12	12			
Burma	C			16															
	D			10															
Madras Presidency	C	2	6	21					9	75	88				3				
	D	1	1	9					4	51	52				1				
Moulmein	C			9					P	5									
	D			1						4	3	2	2						
Rangoon	C	2	1	2	1				2	1							5		
	D	2	1	1	1				1	1							1		
Plague-infected rats		7	3	6	1		1	1	1	1	1	1	1	1	1	1			
Indo-China (see also table below): Pnompenh	C		3																
	D		2																
Iraq:																			
Baghdad	C	23	23	3			1			2	1							1	
	D	9	9	2						1									
Maudhan	C	3																	2
Madagascar (see also table below): Tamatave	C				1						2		1						
Morocco	C												10						

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April. On September 19, 1931, 18 deaths were reported in Changchuanpu and new cases in Kaitung and Fengtien.

[2] On October 17, 1931, plague epidemic was reported in western Shansi Province, China, with 2,000 deaths at Hsinghsien.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	Nov. 7, 1931
Peru (see table below).																			
Senegal (see table below).																			
Siam	C	2	1					1	1	1				1	1				
	D	2	1						1	1				1					
Spain: Hospitalet—Barcelona Province	C							5	1			1	1	1			5		
	D							2				1		1			1		
Syria: Beirut	C			2			1				1	1	1	2					1
Tunisia: Tunis	C	10	11								1				1				
	D	3	1																
Union of South Africa:																			
Cape Province—Plague-infected rats							1												
Orange Free State	C	2																	
	D	2																	

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
British East Africa (see also table above):							
Kenya	C	345	245	154	484	235	14
Indo-China (see also table above)	C	11		2	1		1
	D	2		2	1		1
Madagascar (see also table above):							
Ambositra Province	C	30	19	15	1	2	
	D	29	18	15	1	1	
Antisirabe Province	C	48	7	12	13	22	
	D	47	7	12	12	22	
Miarinarivo Province	C	6	2		8	20	
	D	6	2		7	19	
Moramanga Province	C		2	1	1	3	
	D		2			3	
Tananarivo Province	C	41	18	10	5	15	
	D	40	18	9	5	14	

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Peru	C	8	2	5	3	19	
	D	1		1	2	14	
Senegal:							
Baol [1]	C		4		27	101	13
	D		3		13	58	8
Dakar [1]	C	2	63	64	95	194	45
	D	1	49	56	73	106	31
Diourbel [1]	C						9
	D						3
Louga [1]	C	1	5	4	3	2	10
	D		2	2	1	1	4
Rufisque [1]	C		1	2	34	2	1
Thies [1]	C			12	16	26	12
	D			3	7	16	8
Tivaouane [1]	C	4	19	3	3		
	D		11	2	2		

[1] Reports incomplete.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31
Algeria:																		
Algiers	C	1	8	1														
Constantine	C	1		1						1								
Belgian Congo	C	47	42															
Bolivia.[1]																		
Brazil. Porto Alegre (alastrim)	C	10	5	41	11	6	17		7	13	12	16	12					
	D			1	1				2		2							
British East Africa: Tanganyika	C	13	7	149	1	18			31	4	6	9						
	D			17							1	4						
British South Africa:																		
Northern Rhodesia	C			21			26											
Southern Rhodesia	C		1	2						1								
Canada:																		
Alberta	C			1		1							12				1	2
British Columbia	C			2	2			3		1	1							
Manitoba	C		4									1						
Winnipeg	C										1							
Ontario	C	17	32	35	1		2	2	4		2		5	2	1	9		7
Kingston	C									1								
Ottawa	C		1								1		5	2		1		4
Sault Ste. Marie	C	1																
Toronto	C	1	1															
Quebec	C			1														
Saskatchewan	C	48	54	42		10	6	10	8	8	12	5	1	6	3	1	11	3
Regina	C	2											1			1		
Chile:																		
Antofagasta	C			1														
Chanaral	C	1																
China:																		
Amoy	C	6	4	2	1						1		1					
	D	3	3	2	1						1		1					
Canton	C	3	1	2					1									
Foochow	C	P	P	P		P		P		P		P						
Hankow	C	5	4	3	1		1	1					1					
Hong Kong	C	1																
	D	2																
Manchuria—																		
Harbin (see also table below)	C	3																
Kwantung—Dairen	C	2	1															
Nanking	C	P				1												

[1] An epidemic of smallpox was reported on May 18 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31
China—Continued																		
Shanghai—																		
Foreigners only	C	7	11	3									35	29	17	17	1	
Including natives	D	7	13	6				1	1			1	5	8				
Tientsin	C	2		3														
Chosen (see table below).																		
Colombia:																		
Cali	D	1																
Santa Marta	D										1							
Dutch East Indies:																		
Batvia and West Java	C	2																
East Java and Madura	C	1																
Eritrea	C	3		2					10									
	D								2									
France (see table below).																		
Great Britain:																		
England and Wales	C	570	287	187	26	25	19	21	33		19	45	45	41	34	41	39	
Bradford	C	8	5															
Leeds	C	2																
London	C	183	122	54	6	12	4	4	3	9	5	15	5	17	15	21	20	
London and Great Towns	C	403	228	152	22	20	17	10	13	30	11	34	35	31	25	37	31	
	D		1	1														
Sheffield	C										1	1						
Greece (see table below).																		
Honduras: Puerto Castilla	C													1				
India	C	11,403	7,313	5,359	978	904	645	400	483	481								
	D	1,849	1,704	1,352	234	213	179	120	144	108								
Bassein	C	1																
Bombay	C	9	6	6	1		1			1	2	2						
	D	4	5	6	1					1								
Calcutta	C	59	47	21	4	4		5	2	1	2		1					
	D	73	41	18		4		5	2	1	2		1					
Cochin	C	3				1	1	1					1	1	2	4		
Karachi	C		2		1													
	D		1															
Madras	C	8	2	2	1					1			1	5	6	1		
	D	6	1												2			
Negapatam	C		3	1		2			3		1			1		1		
Rangoon	C	13	6	3	2		1	1	1		1			2				
	D	5	2	1	1			1			1			1	1			

Vizagapatam	C	6	6	5		3		2	3	1	1	1	2	4				
	D	1	2	1		3		1	3	1	1	1		1				
India (French):																		
Chandernagor	C	7	1	3														
	D	5		2														
Karikal	C	4	6	4	1	1	3	2		2	5			5				
	D	4	6	4	1	1	2	2		2	1			1				
Pondicherry Province	C	11	7	28	11	6		3	1	6	1	18	1	4				
	D	11	7	28	11	6		3	1	6	1	16	1	4				
India (Portuguese)	C	3																
	D	1																
Indo-China (see also table below):																		
Pnompenh	C	1	2															
	D	1																
Saigon and Cholon	C	2		3	1	1			1		3	2	1	4	1			
	D	1		1	1				1		2		1	2				
Iraq:																		
Baghdad	C	3	1								1							
	D	2																
Basra	C	2	1															
Mosul Liwa	C			1				1					5					
Ivory Coast (see table below).																		
Japan: Nagoya	C			1														
Mexico (see also table below).																		
Jalisco (State)—Guadalajara	D	2	1	3			2						1	1	2			
Mexico City and surrounding territory	C	45	25	22	8	2			2	2	1		2	1	2	2		
	D	11	13	8	1	1					1	1	1	2		1		
Monterrey	C		1															2
Torreon	C	1	3							1	1			1				
	D		2								1							
Vera Cruz	C	1																
Morocco (see table below).																		
Netherlands: Friesland—Opsterland	C																[1]1	
Poland	C	3	3	18								1						
Portugal: Lisbon	C	67	48	45	17	12	8		10	21	18	17	16	11	6	15		
Rumania (see table below).																		
Siam	C	6	5	1							3							
	D	1	1	1														
Spain	C			7														
Straits Settlements	C	2				1											15	1
	D	2																
Sudan (Anglo-Egyptian)	C	6	1								32							
	D	2									6							
Syria (see table below).																		
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below).																		
Union of South Africa:																		
Cape Province	C	P																
Natal	C							P			P							
Orange Free State	C	P	P	P			P	P	P	P			P					
Transvaal	C		P	P														

[1] Imported case.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31
Upper Volta	C	88	12	2														
	D	1																
On vessel:																		
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C							1										
S. S. Talodi at Suakin	C	1																

Place		April, 1931	May, 1931	June, 1931: 1-10	11-20	21-30	July, 1931: 1-10	11-20	21-31	August, 1931: 1-10	11-20	21-31	September, 1931: 1-10	11-20	21-30	Oct. 1-10, 1931
Indo-China (see also table above)	C	142	58	30	16	1	1		7	29				7	27	10
	D						1		4	11				4	8	3
Ivory Coast	C											7				
	D											4				
Syria: Beirut	C				1											

Place		February, 1931	March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931
China: Harbin (see also table above)	C		7		13	10		
Chosen	C		11		1	4	2	
	D		3				1	
France	C	16	15	6	54	9	20	
Greece	C	4			3	1		
Mexico (see also table above)	D	3		1	1	2		
Morocco	C	4	6	7	49	48	23	23
Rumania	C		1		1			1

Place		February, 1931	March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931
Turkey	C	37	1		9	1		
	D	6						
Union of Socialist Soviet Republics	C		1,903	1,516	1,345			
Territories in Asia	C	532						
Ukraine	C	23						
Other territories in Europe	C	1,577						
Railroads, etc	C	77						

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24
Algeria:																	
Algiers	C	7	9	2													
Bone	C						1	1									
Constantine Department	C	22	26	3	1							2		1			
Oran	C	2	2			1				1							
Australia, Western	C	1															
Bulgaria	C	16	30						1								
	D	4	6														
China:																	
Manchuria—Harbin	C		16						1								
Shanghai	C			3			1						1				
Chosen (see table below).																	
Colombia: Cali	D									1							
Czechslovakia (see table below).																	
Egypt:																	
Alexandria	C		3								1	1					
Cairo	C								1								
Great Britain: Scotland—Fife County	C	1															
Greece (see table below).																	
Guatemala (see table below).																	
Iraq: Baghdad	C	2															
	D	2															
Irish Free State:																	
Cork County—																	
Schull	C			1													
Skibbereen	C		2	1													
Kerry County—																	
Dingle	C	1															
Listowel	C		1														
Kildare County—Naas	C												1				
Limerick County—																	
Croom	C													1			
Glin	C										2			1			
Limerick	C			2	1												
Micholstown	C			1													
Rathkeale	C													1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24
Irish Free State—Continued.																	
Mayo County—																	
Belmullet	C	1															
Castlebar	C							1									
Westport	C							1									
Japan	C		1														
Lithuania (see table below).																	
Mexico (see also table below):																	
Durango	D			1													
Mexico City, including municipalities in Federal District	C	75	46	53	7	6		5	5	1	2	2	4	2	5	3	
	D	33	19	12	5	3		2	1	1		2	2	2	2	2	
San Luis Potosí	D	2		4				1									
Torreon	C			1											1	1	
	D			1											1	1	
Morocco	C	42	101	102		2	1	5						1		3	
	D	4	6	8													
Palestine	C	4	5	2	3	3	1	4				4	4	1	1		2
Panama Canal Zone—Balboa	C	2															
Poland	C	298	97	53	10	4	10	7	6	2	1	2	2	8	3	1	
	D	18	4	5	1		1							1			
Rumania	C	169	80	11	7	9	4	3		4	6	3	1	6			
	D	18	13	5		1		1				1					
Syria	C	4															
Tunisia: Tunis	C	29	73	2					1		1	1					
	D	3	4														
Turkey (see table below).																	
Union of Socialist Soviet Republics (see table below).																	
Union of South Africa:																	
Cape Province	C	P	P	P		P	P	P	P	P	P	P	P				
Municipality of East London	C		1		1												
Natal	C	P	P	P		P					1						
Orange Free State	C	P	P	12													
Transvaal	C	P	P	P		P	P	P	P	P	P	P	P				
Yugoslavia (see table below).																	

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Chosen: Seoul	C	3	4		6	1		
	D		1		1	1		
Czechoslovakia	C		5	11	2			
Greece	C	8	22	6	9	2	13	5
	D	1	3				2	
Guatemala	C				33	34	3	
	D				15	5		
Lithuania	C	99	34	10	13	8	2	
	D	3	5		2			
Mexico (see also table above)	D	238						
Turkey	C	15	32	13	11	9		
Union of Socialist Soviet Republics	C	2,206	1,513	1,324				
Yugoslavia	C	10	43	14	2	3	1	
	D	1	5					

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	Nov. 7, 1931
Brazil:																			
Alagoas State	C						1												
	D						1												
Maceio	D																		1
Ceara State	C	1	1					1											
	D	1						1											
Minas Geraes State	C	2																	
	D	1																	
Rio de Janeiro State	C	2																	
Sergipe State	C		1																
British Cameroons: Mamfe	C	3	2																
	D	2																	
Colombia: Magdalena Province—Near Cienaga	C			4															
Gold Coast:																			
Akuse	C			2															
	D			1															
Dagomba District	C				2	2													
Kete Krachi	C															1			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended—															
					August, 1931					September, 1931				October, 1931					Nov. 7, 1931
					1	8	15	22	20	5	12	19	26	3	10	17	24	31	
Gold Coast—Continued.																			
Kintampo	C			1															
	D			1															
Oda	C												1						
	D												1						
Tamale	C			2										2			1		
	D			2										2					
Wale Wale	C				1														
	D				1														
Ivory Coast:																			
Bobo Dioulasso	C			1															
	D			1															
Grand Bassam	C				4						1								
	D				2						1								
Kong Circle	C			4															
Seguela	C							P											
Tehini	C																		1
Nigeria	C						1											1	
	D						1												
Senegal:																			
Podor (Hinterland)	C							1											
	D							1											
St. Louis	C												1						
Thies	C												1						
	D												1						
Sudan (French)	C			4															
Macina—Kayo Circle	C																		2
Togo (French): Atakpame—Anie Circle	C																		1
Upper Volta:																			
Banfora	C			2									2						
	D			1									1						
Dedougou	C																	2	
Diarabakoko	C												2						
	D												1						
Ouagadougou	C							1					1			1			

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

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SPECIAL ARTICLES

Prevalence of Communicable Diseases in the United States

Pathology of Eastern Type of Rocky Mountain Spotted Fever

UNITED STATES
GOVERNMENT PRINTING OFFICE
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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of public health.

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PUBLIC HEALTH REPORTS

VOL. 46 NOVEMBER 27, 1931 NO. 48

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES[1]

OCTOBER 11–NOVEMBER 7, 1931

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized in this report. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Poliomyelitis.—The number of cases of poliomyelitis dropped from 4,122 during the 4-week period ended October 10 to 1,804 during the current period. Each geographic area, and, in fact, each reporting State, shared in the decline. For the first time since the beginning of the outbreak the incidence was slightly below that for the corresponding period of last year, the number of cases being about 11 per cent lower for the current period than for last year. The number was, however, about four times the number of cases recorded for 1929.

From a comparison of the recent reports of poliomyelitis with the incidence in previous years, it is evident that the present outbreak has been largely confined to States along the Atlantic coast and in the Great Lakes region, with very little rise in the Mississippi Valley and far western States. In 1930 poliomyelitis was much above normal in the West, first in the Mountain and Pacific States, passing to the South Central areas, and then to the West North Central States. The East North Central States and New England and Middle Atlantic States experienced rises in 1930, but the number of cases reported was far less than the number reported in those regions during the current year.

In the New England and Middle Atlantic and East North Central groups of States a decline of more than 60 per cent from the preceding 4-week period was reported for the current 4-week period of 1931. In the former group the number of cases was still more than double the number reported for the same period last year and about six times the number in 1929. In the latter group the number (443) represented a 20 per cent decline from last year's figure, but it was more than four

[1] From the Office of Statistical Investigations, U. S. Public Health Service. The number of States included for the various diseases are as follows: Typhoid fever, 47; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 45, diphtheria, 47; scarlet fever, 47; influenza, 39 States and New York City. The District of Columbia is counted as a State in these reports.

times the number in 1929. In the South Atlantic States the cases dropped from 95 during the preceding period to 51 for the current period. While in this area the reported cases have been considerably above those of 1930, the number of cases has not at any time equaled the number reported in 1929.

In the other areas, those mostly affected by the 1930 epidemic, the Mountain and Pacific States, reported 48 cases for the current period, as compared with 329 cases for the same period in 1930 and 27 in 1929; the South Central groups reported 27 cases as against 98 last year and 18 in 1929; in the West North Central 221 cases were reported as compared with 571 in 1930 and 39 in 1929.

Diphtheria.—The number of cases of diphtheria, 9,816, was the highest on record for the corresponding period in the four years since 1927, when 9,842 cases were reported for this period. Increases in the various geographic areas were shown as follows: In the East North Central States the number of cases was one and two-tenths times the number in the corresponding period of last year; in the West North Central group more than twice as many cases were reported during the current period as occurred in 1930; and in the South Atlantic, South Central, and Mountain and Pacific groups the numbers of cases were one and four-tenths, two and seven-tenths, and one and two-tenths times, respectively, the numbers in 1930 for the same period. The New England and Middle Atlantic States were the only groups not participating in this unfavorable increase; there a decrease of 21 per cent was shown.

Approximatley 3,500 more cases of diphtheria were reported during the 4-week period ended November 7 than were reported during the preceding 4-week period.

Smallpox.—In relation to previous years, the smallpox situation was very favorable. The number of cases reported for the current period represented only about 73 per cent of the number reported for the same period of 1930 and approximately 35 per cent of the number in 1929. All regions except the New England and Middle Atlantic and South Central were lower than last year. In the former groups, Vermont and New York showed the largest increases, while in the South Central group Kentucky, Alabama, and Mississippi seemed to be mostly responsible for the increase over the preceding year.

An increase of about 80 per cent was noted in the number of cases of smallpox reported for the 4-week period ended November 7 over the preceding 4-week period. All areas shared to some extent in this seasonal increase.

Measles.—The incidence of measles in relation to that for the same period of last year was considerably higher in the New England and Middle Atlantic States (72 per cent) and in the South Atlantic States (66 per cent), but all other regions showed decreases, ranging from 23 per cent in the Mountain and Pacific States to 60 per cent in the

South Central groups. For the country as a whole, the excess over last year was only about 8 per cent. During the same period in 1929 the number of cases totaled 5,573.

The number of reported cases of measles (4,244) for the current 4-week period was more than twice the number reported for the preceding 4-week period. All regions contributed to this seasonal increase except the South Central; in that group a decrease of about 50 per cent in the number of cases was shown.

Scarlet fever.—The reported current incidence of scarlet fever continued to be about 23 per cent in excess of that of last year for the same period and was 10 per cent above 1929. The excess over last year has, during recent weeks, been apparent in all parts of the country. The areas showing the greatest increases during the current period over last year were the New England and Middle Atlantic (35 per cent), South Central (36 per cent), and Mountain and Pacific (55 per cent).

Typhoid fever.—The incidence of typhoid fever for the current year reached its peak during the latter part of September. For the current 4-week period there were 3,015 cases reported, which was approximately 1,100 less than occurred during the preceding 4-week period. In relation to the experience of previous years, the current incidence was about 4 per cent below the incidence for the same period in 1930, but was 35 per cent above the incidence in 1929. Decreases in the various areas ranged from 11 per cent to 32 per cent. The number of cases in the South Atlantic States approximated last year's figure, and in the South Central areas an increase in the number of cases of 16 per cent was reported.

Influenza.—During the current 4-week period the incidence of influenza increased about 35 per cent over the preceding period, but for the first time for several 4-week periods the number of cases reported was less than for the corresponding period last year. For the entire reporting area, the number of cases totaled 2,233 as compared with 2,522 last year and 3,416 in 1929. While the number of cases reported from the Mountain and Pacific regions was small (347), it was almost double the number reported last year at this time and was slightly above the figure for 1929.

Meningococcus meningitis.—For this disease the incidence continued very favorable during the current period. The total number of reported cases was 225 as compared with 319 for the corresponding period in 1930 and 384 in 1929. Practically all areas participated in the decline, the decreases ranging from 33 per cent to 49 per cent in the various regions.

Mortality, all causes.—The deaths from all causes in large cities as reported by the Bureau of the Census continued low, viz, 10.1 per thousand population, annual basis. The average for the preceding five years for the corresponding period was 11.6.

PATHOLOGY OF THE EASTERN TYPE OF ROCKY MOUNTAIN SPOTTED FEVER

By R. D LILLIE, *Passed Assistant Surgeon, United States Public Health Service*

Only about 20 autopsies on cases dying of Rocky Mountain spotted fever have been published. Buckley (1), in 1897, reported a much enlarged spleen as the only abnormal finding. Wilson and Chowning (1) reported six more autopsies in detail, and in a later report (2) included another case, no details of which are available, and the autopsy published in detail by Anderson (3, 4) which was performed by Anderson and Wilson. Almost identical reports on one case in 1904 were published independently by Stiles (5) and Ashburn (6). Ricketts (7) reported generally on the gross findings in six cases and Le Count (8) recorded the histologic details on the same cases. Wolbach (9) added one partial and four complete autopsy reports. These 21 cases all occurred in the Bitterroot Valley region of Montana.

The first recorded autopsy on what was probably a case of the eastern type of spotted fever was reported by Pinkerton and Maxcy (10) as endemic typhus. This case occurred on an isolated farm near Charlottesville, Va. In regard to this case Pinkerton now expresses his opinion as follows: "If Doctor Lillie finds an identical pathological picture, and if the strain recovered from the patient showing that picture is immunologically spotted fever and not typhus, I am quite willing to admit the probability of our case belonging to Dyer's (15) group of 'Eastern spotted fever'." (Letter of October 8, 1931, addressed to Maxcy.) And Maxcy says, "In reviewing all of the clinical and epidemiological facts in this case, it is my opinion that the evidence is more in favor of spotted fever than of endemic typhus." The demonstration of brain lesions in spotted fever hereinafter to be reported were communicated to Maxcy, and he considered this as strengthening his opinion that this case was in fact spotted fever.

The details of the above reports will be discussed in conjunction with and following the original data herein presented.

No attempt has been made thoroughly to review the pathology of European typhus for comparison with spotted fever, reference being made only to Ceelen's (11) review and two rather extensive articles not included therein, those of Grzywo-Dabrowsky (12) and Wolbach, Todd, and Palfrey (13). Citations of several other authors have been taken from Ceelen's and Wolbach's papers, and are not included in the list of references

The following account is based on four autopsies attended or performed by the writer and on histologic material obtained from these and one other case. I am indebted for this material to Drs. E. C. Rice, M. A. Selinger, and L. Neuman, of Washington, and to

Maj. J. V. Falisi, Medical Corps, United States Army, and to the laboratory staff of the Walter Reed Hospital in Washington.

Further acknowledgment is made to Passed Assist. Surg. A. Rumreich for the clinical and epidemiological data which identify the cases herein reported as Rocky Mountain spotted fever.

Summary of Clinical and Epidemiological Protocols

Case 1.—White male automobile mechanic, aged 48. Onset July 12, 1930, with headache and chill. Fever rose to 105.2° F. by end of first week, with pulse of 102–140. Involuntary urination and defecation, stupor and delirium after first week. Coma late in second week to death on sixteenth day. Generalized red macular eruption first noted on sixth day, becoming petechial on ninth day. Leucocytes 21,000 on tenth day. Spinal fluid clear on eighth day. Weil-Felix positive 1:160 on fifteenth day. Tick found attached to left arm six days prior to onset.

Case 2.—White schoolboy, aged 9. Prodromal restlessness began September 3, 1930; onset with headache and stomach ache, constipation, and rigidity of neck September 5, and spleen palpable. Appendectomy September 6. Spinal fluid clear September 8. That afternoon a red macular rash appeared first on arms and chest, generalizing the same evening and becoming petechial in a few days. Leucocytosis of 10,000 on September 7 and 27,000 on September 11. Death September 12. Autopsy 27 hours postmortem. Weil-Felix positive, 1:1280, on postmortem serum specimen. Had removed ticks from dog and crushed them about a week before onset.

Case 3.—White female housekeeper, aged 37. Onset June 2, 1931, with chilliness and headache. Temperature ranged from 100.5° to 104° F., pulse 100 to 136. Meningismus, hyperesthesia, and enlarged spleen noted. Macular rash appeared June 5 on ankles and wrists, generalized June 7, became petechial June 12, being most abundant on extremities. Spinal fluid negative; leucocytes 12,400; and Weil-Felix positive, 1:1280, June 13. Died June 13, autopsy same afternoon. Engorged tick found attached to scalp 3 days before onset.

Case 4.—White male farmer, aged 65. Onset July 1, 1931, with chills and fever. Temperature range 99.6° to 102.3° F. Red macular rash appeared July 4 on arms, legs, and back, later generalizing sparsely and becoming petechial. Hemorrhage from mouth and bowel on July 9 and 11. Muscular twitching, hypertonicity and late coma. Leucocytes 10,700 on tenth day; Weil-Felix positive, 1:5120, July 12. Death July 13, 11 a. m.; autopsy 5 p. m. Ticks removed from clothing several times during week preceding onset, but no definite history of bites.

Case 5.—White male, aged 7. Onset August 5, 1931, with persisting headache and fever of 101° F., rising to 106° F. by fourteenth day, and pulse range of 110–150. Constipation in first week, involuntary urination and defecation later. Restlessness, irritability, and periods of delirium; coma late in second week. Meningismus; clear spinal fluid; splenomegaly noted. Red macular rash appeared on arms August 8; generalized next day; becoming petechial August 13. Leucocyte counts of 5,000 on fourth day, 9,000 on ninth, and 10,000 on fourteenth day. Weil-Felix positive 1:5120 on sixteenth day. Death August 21 (sixteenth day). Engorged tick found attached to scalp 5 days before onset.

Gross Pathology

Skin.—The eruption was much less distinct than during life, indistinctly macular or mottled in character, bluish in color; distinctly

petechial in case 4. The rash was most distinct on the chest and abdomen in two cases and on the extremities in one case.

In the western type of spotted fever there have been generally noted hypostatic lividity and more or less numerous petechiae and extravasations (Wilson and Chowning (1), (2), Anderson (3), (4), Stiles (5), Ashburn (6). Purplish and red and white mottling of the arms and legs was recorded by Wilson and Chowning. Anderson (3) described marked diffuse icterus in his one detailed report (case 120) and noted less marked jaundice in his summary based on seven autopsies (presumably Wilson and Chowning's material). Icterus was also noted constantly by Ricketts. Scrotal sloughing or hemorrhage and necrosis were reported in Anderson's case 120 and by Wolbach (9), and were noted clinically by Ricketts (7) as occurring in Idaho cases, but were absent in Pinkerton and Maxcy's (10) case and in the writer's three autopsies on male subjects.

Body musculature.—Noted as pale red in two cases, dry in one case, and moist in the other. Stiles (5) and Ashburn (6) reported the muscles as normal.

Serous membranes—Peritoneum.—Not remarkable, except in case 2, in which appendectomy was performed six days before death and there was much clear dark brownish fluid with some fibrin over the lower ileum and reddening of the caecum. *Pleurae.*—In case 2 similar exudate to that in the peritoneum was seen on the right side. In case 3 there was total fibrous adhesion on the left; otherwise the pleurae were not remarkable. *Pericardium.*—Epicardial thickening and opacity along the vessels was recorded in case 2 (a boy of nine years), otherwise no significant changes were seen.

Wilson and Chowning (1) noted an increase in pericardial fluid in two of their six autopsies and a similar increase was found by Ashburn (6) and Stiles (5) in their case. The latter authors also reported an excess of clear yellowish peritoneal fluid. The pleurae and pericardium were normal in Anderson's (3) case 120, and the pericardial, pleural, and peritoneal cavities were essentially negative in Pinkerton and Maxcy's (10) case.

Heart.—The heart was very soft and flabby in two cases, somewhat dilated in one, and thickened and firm in case 4 (generalized and coronary arteriosclerosis). The muscle was moist and more or less congested. The valves were normal.

Wilson and Chowning (1) found the heart muscle softened in five cases, pale in one case, the organ dilated in one, and noted epicardial hemorrhages in three of their six cases. The heart of Anderson's (3) case 120 was contracted, the myocardium rather pale and flabby. The heart muscle was normal in Ashburn (6) and Stiles' (5) case. In Wolbach's (9) three autopsies the heart was normal in size, contracted and firm, with yellowish foci in the myocardium in one case. The heart was essentially negative in Pinkerton and Maxcy's (10) case.

Lungs.—Generally more or less congested and edematous, exuding pinkish frothy fluid from the bronchi. In cases 1 and 4 poorly defined areas of soft consolidation were found in the left lower lobe. Slightly or moderately enlarged anthracotic lymph nodes were seen in the hilus region; in case 2 some of these were caseous.

The lungs of Wilson and Chowning's (1) four cases showed only hypostatic congestion, while in Anderson's (3) case 120 there were only a few points resembling emboli. Stiles (5) and Ashburn (6) found marked congestion and edema with hypostatic pneumonia in the lower lobes posteriorly, and in one of his six cases Ricketts (Le Count (8)) found a lobular pneumonia. Wolbach (9) described a broncho-pneumonia in his case 5, and Pinkerton and Maxcy (10) also noted a dark red consolidation in the lower lobe of the right lung in their case.

The bronchial lymph glands were enlarged and black in Ashburn (6) and Stiles' (5) case.

Liver.—Moderate fatty infiltration in case one, firm, cloudy and opaque on section in cases two and three, rather soft in case four, not notably enlarged in any.

In spotted fever in the Rocky Mountain area slight enlargement was described by Wilson and Chowning (1) (2), moderate enlargement by Ashburn (6) and Stiles (5) and by Ricketts (7), and marked enlargement (92.5 oz., or 2,622 gm.) by Anderson (1). Pallor and more or less fatty infiltration have appeared in Wilson and Chowning's, Anderson's, Ashburn and Stiles'; and some of Ricketts' cases. In Wolbach's (9) three autopsies and in Pinkerton and Maxcy's (10) case of the eastern type of spotted fever the liver was normal. No softening or focal lesions were noted in any of these reports.

Spleen.—Slightly to moderately enlarged (11 by 8 by 3 cm. in case 1, 150 gm. in case 2 (9-year-old boy), 335 gm. in case 3, 280 gm. in case 4), firm and dark bluish red in cases 1 and 2, very soft in cases 3 and 4, grayish pink in case 3, purplish red in case 4. Malpighian corpuscles were inconspicuous. That the enlargement was not attributable to the coincidence of grossly demonstrable pneumonia is shown by the relatively greater splenomegaly in cases 2 and 3 in which pulmonary consolidation was not grossly evident.

In the western type of spotted fever Buckley in 1897 (Wilson and Chowning (1)) found the "spleen largely increased in size." Wilson and Chowning's six cases, Anderson's (3) case and Stiles' (5) and Ashburn's (6) case showed enlargement to between 250 and 700 gm., the color was dark red or purple, and the organ was regularly soft and diffluent. Ricketts (7) found an enlargement to two or three times normal size, Wolbach (9) to two to five times. The spleen was firm in Ricketts' and two of Wolbach's cases, soft, diffluent and ruptured in the third. Ricketts said the spleen appeared as if very cellular in structure and noted multiple foci resembling infarctions in one case.

In Pinkerton and Maxcy's (10) case of the eastern type of spotted fever the spleen was essentially negative.

Kidneys.—In cases two and three the cortex was pale and opaque, in case four the surface was granular, the cortex narrow and the arteries thickened.

In the western type of spotted fever capsular ecchymoses were reported regularly by Wilson and Chowning (1) and by Anderson (3), and pelvic hemorrhage by Anderson. Slight to moderate cortical congestion was noted by Wilson and Chowning and by Anderson. Stiles (5) and Ashburn (6) noted capsular adhesion, and the cortex was normal in one kidney, pale and swollen in the other. Swollen degenerated kidneys were noted by Ricketts, while in Wolbach's (9) three autopsies the kidneys were normal in size, the cortex was rather narrow (6–7 mm.) in two, and pale in one. Acute lesions were absent in the kidneys of Pinkerton and Maxcy's (10) case of the eastern type of spotted fever.

Adrenals.—Thin bright yellow cortex in cases 3 and 4, pale in case 2, normal in case 1. The two adrenals were respectively normal and congested in Stiles (5) and Ashburn's (6) case.

Gastrointestinal tract.—Dull serosa and injected mucosa, but no other lesions in case 2 (the appendix was not preserved); few punctate hemorrhages in mucosa in case 1; no evident abnormalities in cases 3 and 4.

The gastrointestinal tract was normal in Wilson and Chowning's (1) six cases, as it was in Anderson's (3) case 120, while Ashburn (6) and Stiles (5) noted slight swelling of the solitary follicles and Peyer's patches, and injection of the colon.

Mesenteric lymph nodes.—Enlarged and grayish pink in case 2, slightly enlarged and one calcified in case 1, not enlarged in cases 3 and 4.

Small pale retroperitoneal and mesenteric lymph glands were noted by Anderson (3), while Ricketts (7) described uniformly enlarged, moderately congested lymph nodes.

Prostate and bladder.—Normal in two cases. The bladder was normal also in Wilson and Chowning's (1) six cases and in Anderson's (3) case.

Ovaries.—Fibrotic and atrophied in case 3; adhesions and cyst about tubes; some white subserous nodules on right cornu of uterus. No specific lesions were noted in Stiles' (5) and Ashburn's (6) puerperal case.

Testes.—In the two adults (cases 1 and 4) rather soft, but without evident abnormality; in case 2 normal; in case 5 (boy of 7) there was radial hemorrhagic streaking on the cut surface.

Marked injection of the tunica vaginalis and epididymis was noted by Wolbach (9) in two of his three autopsies. The testes also showed

some injection. Interstitial hemorrhages were seen in one epididymis in one case. The testes were essentially negative in Pinkerton and Maxcy's (10) case of spotted fever of the eastern type.

Bone marrow.—Fatty and congested in the shaft of the femur in cases 1 and 2, dark red and moist in ribs, vertebrae, or sternum in all.

Brain.—The pia mater showed slight, moderate, and rather marked injection of vessels, in cases 1, 2, and 3, respectively, with some areas of gelatinous edema in the last, and scattered small opaque areas in the first. Case 4 presented marked arteriosclerosis of the great vessels at the base and in the small meningeal vessels, with moderate cortical atrophy. The brains were hardened whole in formalin before sectioning. No evident gross lesions were discerned in any of the five cases.

Generally no gross lesions of the brain have been reported in spotted fever in the Rocky Mountain area, (Wilson and Chowning (1), 2 cases; Anderson (3), general summary, no specific cases; Stiles (5) and Ashburn (6), 1 case; Ricketts (7), 6 (?) cases; Wolbach (9), 1 case). Stiles and Ashburn noted meningeal injection, Ricketts slight meningeal congestion and edema; Wolbach marked pial injection and considerable excess of clear fluid in the pia-arachnoid. In Pinkerton and Maxcy's (10) case of spotted fever (eastern type) the brain was markedly congested and rather soft and pink in color on section.

Technique

Material from the various organs was fixed in Orth's fluid and frozen and paraffin sections were prepared. The frozen sections were stained with alum hematoxylin and sudan IV for fats, the paraffin sections with Weigert's iron chloride hematoxylin and Van Gieson's picrofuchsin, alum hematoxylin and eosin, with French's tetrachrome Giemsa modification or eosin and polychrome methylene blue for rickettsiae and leucocyte granules, with Gram and with Weigert's fibrin method.

Blocks from 16 to 30 areas of the brain were impregnated for 48 hours in 2½ per cent potassium bichromate after formalin fixation, then dehydrated, cleared, and imbedded in paraffin. A few blocks were prepared by the Marchi method. The sections of the chromated material were stained with iron chloride hematoxylin and Van Gieson's (Freeborn) picrofuchsin for nerve tissues, toluidine blue for Nissl granules, and some by Weil's modification of the Weigert myelin stain.

Microscopic Pathology

Brain.—In all five cases the pia mater showed patches of edema and of cellular infiltration. The latter were often dense and perivascular and comprised chiefly small lymphocytes, or more or less diffuse, and were composed of large mononuclear cells of macrophage

type mingled in varying proportions with lymphocytes. Meningeal vessels mantled by lymphocytes occasionally showed hyaline thrombosis. (Fig. 1.)

In one case (case 5) the chorioid plexus of the lateral ventricle showed several foci of pericapillary lymphocyte infiltration. Some macrophages were present in some of the foci. Some of the included capillaries showed endothelial necrosis and hyaline or necrotic cellular thrombosis. (Fig. 2.) In another case (case 2) occasional capillaries showed swollen vacuolated endothelium; rarely others showed concentric endothelial proliferation, and there were focal areas of infiltration by numerous large vacuolated, occasionally phagocytic macrophages, lymphocytes, and few plasma cells and polymorphonuclears. Other nodules were composed of vacuolated stellate fibroblasts and round cells. Perivascular lymphocyte infiltration was seen about a single vessel in case 1 and about occasional vessels in case 3, while case 4 showed no lesions in the chorioid plexus.

Lesions were constantly present within the brain substance, in contrast to the negative findings of Wilson and Chowning (2), Le Count (8), and Wolbach (9) in spotted fever as seen in the Rocky Mountain area. In Wolbach's one case there were only three vascular lesions observed in the brain, consisting of intimal collections of mononuclears which were sometimes phagocytic, and polymorphonuclear leucocytes on the intimal surface and in the walls of two veins and one artery.

In our material, lesions were relatively scanty in the cerebral cortex and more numerous in the medulla, though never as numerous as reported in some cases of European typhus. As in typhus (Krinitzky (14), Wolbach (13)) lesions were found in the olivary nuclei and in the cerebellar cortex. In case 2 lesions were very scanty, and in none were they very numerous.

The brain lesions fall into three general classes: Those involving vessels and their sheaths, focal proliferative lesions in the brain substance, and focal necroses.

The vascular lesions present various pictures in the same case. Some vessels show only scanty to moderate lymphocyte infiltration in the perivascular sheath, between the vessel wall and the surrounding brain substance. (Figs. 3, 4.) Arterioles and venules often show more marked vessel sheath infiltration, here by lymphocytes and sometimes macrophages and plasma cells, and in some complete necrosis with karyorrhexis extending through the media and the adventitia. Other small vessels present endothelial swelling, necrosis, and thrombosis. Such thrombi are hyaline in character or may contain nuclear fragments, indicating a cellular origin. There are occasional pericapillary hemorrhages confined to the vessel sheaths. (Fig. 5.) Some small vessels show concentric proliferation and

occlusion either by the endothelial cells (fig. 6) or by central thrombi. Definite adventitial fibroblast proliferation is not often seen.

Proliferative reaction may be manifest only as an accumulation of medium sized, oval, leptochromatic glia nuclei in single rows along the sheaths of vessels which may be apparently normal (fig. 7) or may present endothelial proliferation or swelling and thrombosis. More often characteristic nodes are formed, often adjacent to vessels (figs. 8, 9, 10), often not apparently related to vessels. (Fig. 11.) These are compact and fairly well defined. They are composed of small, round, densely stained nuclei, without cytoplasm being evident by ordinary methods; others include also rod-shaped nuclei, other larger round cells with leptochromatic nuclei, and broader cytoplasm. The last cell type may sometimes fuse into apparently syncytial masses.

As focal necroses there are defined sharply circumscribed areas of rarefaction and vacuolation of brain substance. These are usually in the white matter and contain rounded and elongate masses of hyaline material stained red to pink by Van Gieson (Freeborn) and light yellow by the Weil-Weigert myelin technique. These hyaline masses, when elongate, lie parallel to each other and are two to three times the thickness of the near-by normal myelinated fibers. The formation of these hyaline masses seems to be an early phase in the evolution of these lesions. (Fig. 12.) The included nuclei of small glia cells are dense, small, and pyknotic, or may be entirely lacking. A somewhat later phase appears to be that in which large central vacuoles appear and coalesce (fig. 13), and in such lesions the hyaline fuchsinophil material may be lacking (fig. 14). These phases both lack any trace of marginal proliferative reaction. Thrombosed necrotic arterioles are often seen in the centers of such lesions (fig. 15), or may be found near their borders (fig. 13), or not evidently associated with focal necroses. The hyaline fuchsinophil masses are interpreted as coagulated necrotic myelinated fibers, and a few normal fibers may be seen traversing such lesions (myelin stains). A few such lesions are partly hemorrhagic. As a still later phase there are interpreted less frequent circumscribed areas of coarse vacuolation of ground substance without marginal hyaline masses and with marginal accumulation of loosely packed large amoeboid, stellate, and rod glia cells with oval leptochromatic nuclei.

Such focal necroses were found in all but case 2 and occurred chiefly in the white substance in the brain stem, in the internal capsules, and in the corpus callosum. The number found in the routine examination of 18 to 20 blocks of brain tissue varied from none in case 2 to 14 in case 5.

From the frequent presence in or in relation to these lesions of thrombosed vessels of precapillary or arteriolar size, it seems probable that

the necroses are infarctive in nature and dependent on the vascular injury.

No especial search for rickettsiae was made in this material, though clumps of minute basophilic rod-shaped inclusions were occasionally found in swollen endothelial cells of thrombosed capillaries.

The brain lesions just described are strikingly similar to those described in Pinkerton and Maxcy's (10) case, all the above varieties of lesions being identifiable in their description or figures.

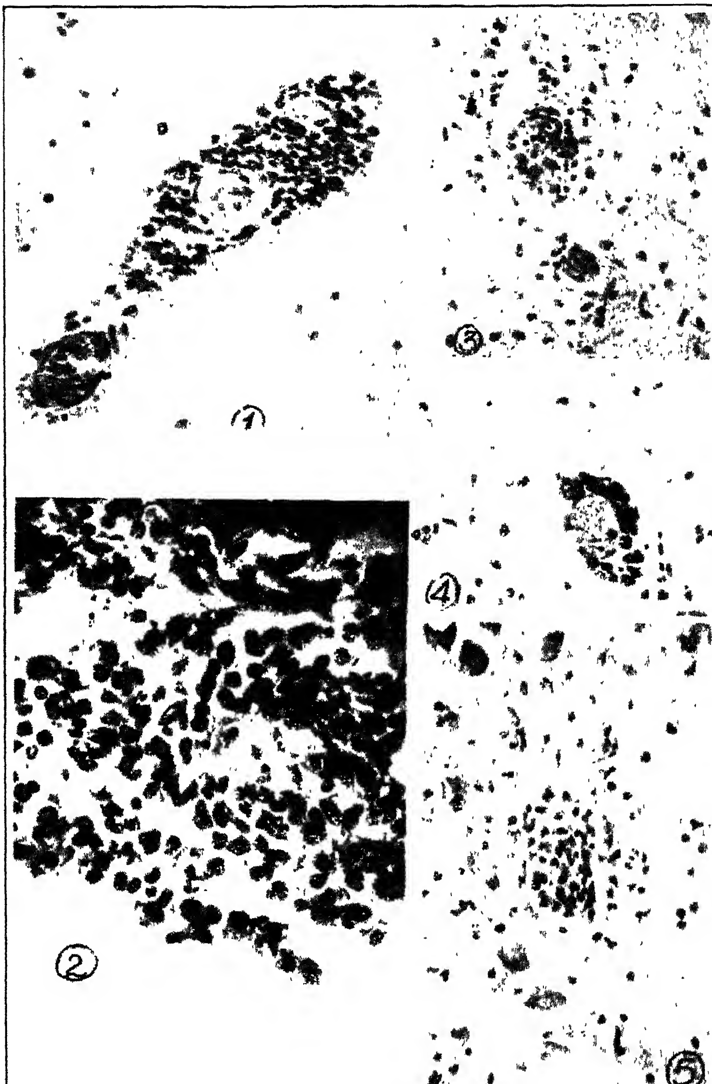
The lesions here reported in spotted fever bear a striking resemblance to those reported in European typhus, in so far as meningeal, proliferative, and vascular lesions are concerned. Such lesions as the focal necroses described by Pinkerton and Maxcy (10) and by the writer, do not appear to have been described in European typhus (Grzywo-Dabrowsky (12); Ceelen (11); Wolbach, Todd, and Palfrey (13); Krinitzky (14)) and may well constitute a differential diagnostic point when present.

Similar nodal and vascular lesions in the chorioid plexus have been noted as almost constantly present in European typhus by Ceelen (11), but were not found in any case by Wolbach, Todd and Palfrey (13).

In guinea pigs inoculated with the virus of the eastern type of spotted fever the writer has demonstrated (Badger, Dyer, and Rumreich (15)) focal glioses and various vascular lesions in the brain, and similar lesions have been found late in the course of the disease in some guinea pigs inoculated with a spotted fever virus obtained from Hamilton, Mont. (unpublished data).

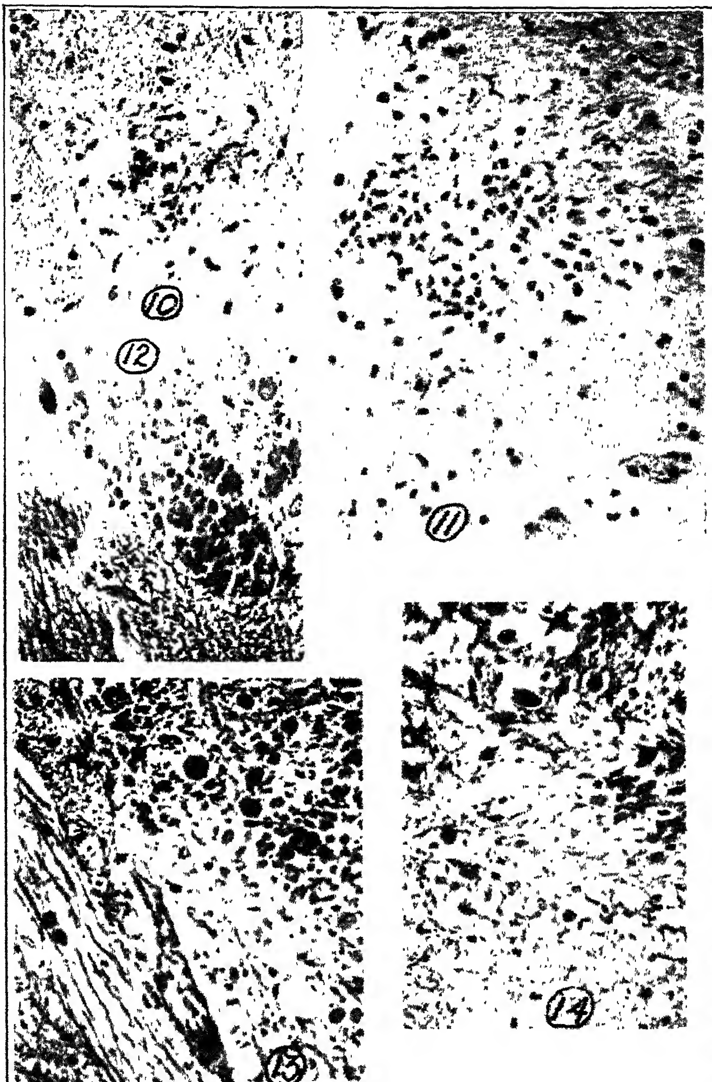
Heart.—Areas of transverse fragmentation of muscle fibers of greater or less extent were present in cases 1, 3, and 4, most marked in cases 1 and 3, in which the muscle was quite soft grossly. Focal areas of marked fatty degeneration showing many small fat droplets within the muscle fibers, and sharply limited peripherally, were seen in cases 1 and 5. (Fig. 16.) Focal areas of muscle fiber oxyphilia, hyalinization, and karyolysis or karyorrhexis, grading into coagulative necrosis, were observed in cases 3 and 5.

Vascular endothelial swelling, proliferation to several layers, and necrosis, with or without occlusion by masses of granular oxyphil material sometimes containing nuclear fragments were seen in all cases. Such vessels were usually of capillary or precapillary size, and these and other otherwise apparently uninjured vessels were often surrounded by adventitial cellular infiltrations comprising chiefly lymphocytes, and, to a less extent, plasma cells, macrophages, mast cells, and eosinophils. Similar, often dense, focal cellular infiltrations were seen not obviously associated with vessels. (Figs. 17, 18, 19.) Rickettsiae were not identified in the vascular lesions. Larger veins and muscular arteries were not involved except for lesions clearly assignable to atherosclerosis in cases 1 and 4. Cellular exudation of



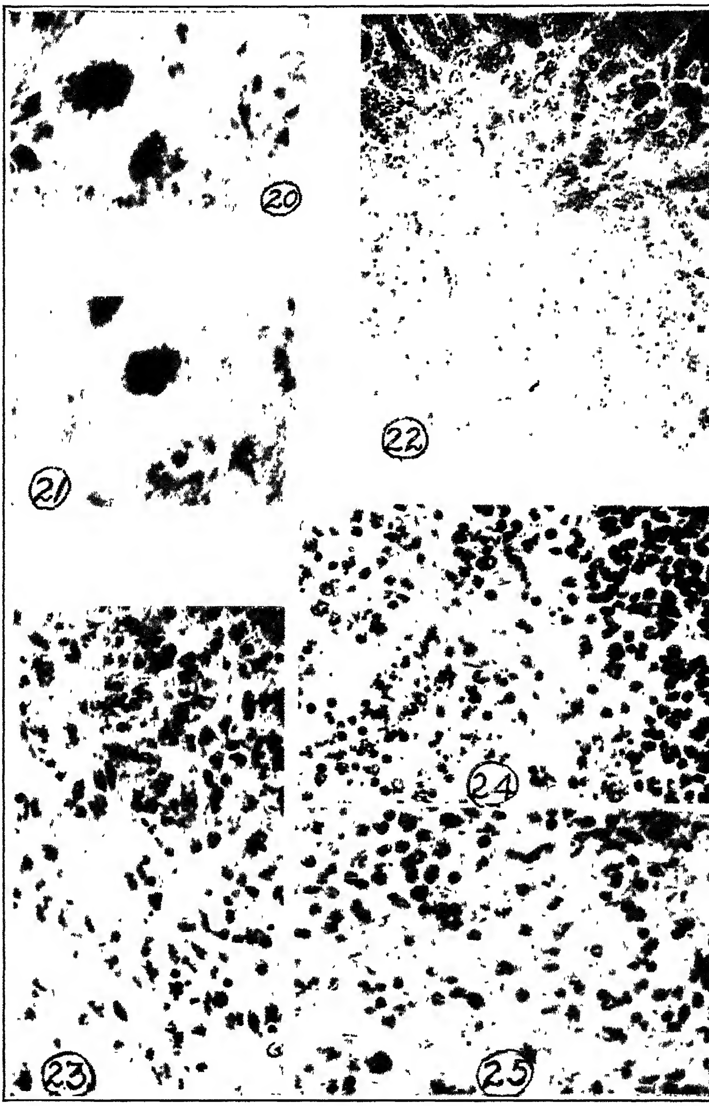
(1) Case 3. Hyaline thrombosis and perivascular infiltration, cerebellar pia, × 300. (2) Case 5: Vascular endothelial swelling, perivascular lymphoid infiltration, choroid plexus of lateral ventricle, × 210. (3) Case 5: Perivascular lymphocyte infiltration, olive, × 210. (4) Case 3: Perivascular lymphocyte infiltration, medulla, × 300. (5) Case 3: Proliferative obliterating endangeitis, olive, × 300. (All reduced approximately one-fourth)

(6) Case 3 Perivascular hemorrhages, olive, × 300 (7) Case 5 Perivascular gliosis, floor of fourth ventricle × 240 (8) Case 3 Focal glioses in medulla × 300 (9) Case 3 Focal gliosis in pons, × 300 (All reduced approximately one fourth)

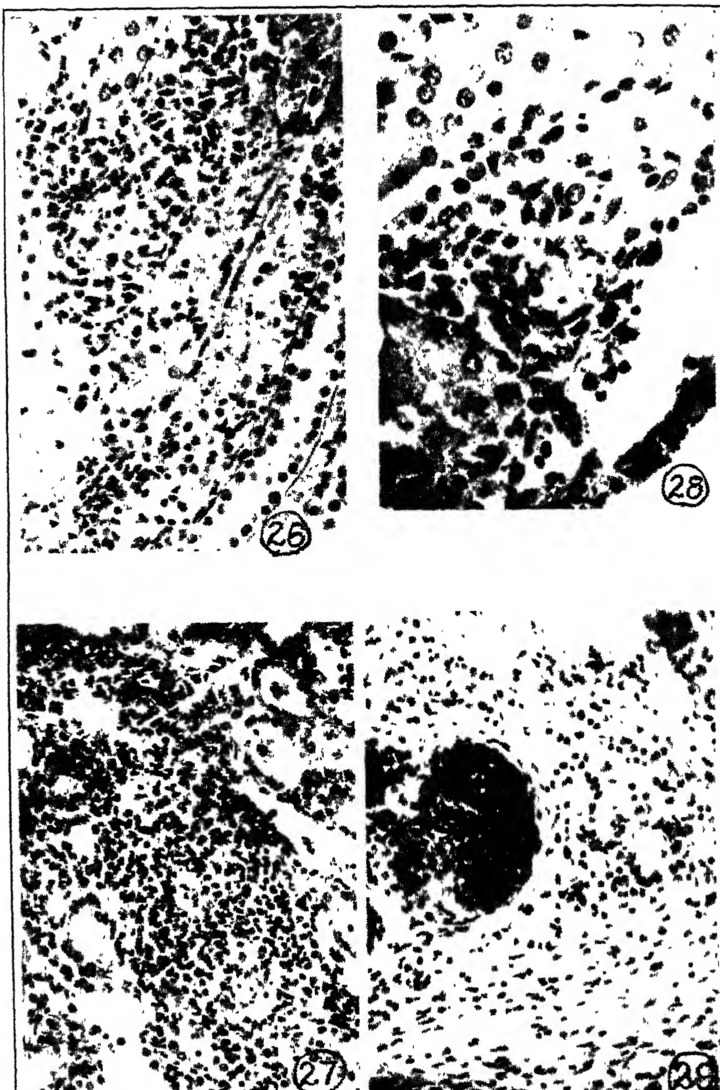


(10) Case 5: Perivascular gliosis, supraolivary zone, medulla, × 240. (11) Case 3: Focal glioses, hilus of olive, × 300. (12) Case 5. Focal necrosis, hyaline globules and masses, medulla, × 240. (13) Case 5: Focal necrosis, necrotic vessel, hyaline masses and rarefaction, medulla, × 240. (14) Case 5· Focal necrosis, more advanced rarefaction, medulla, × 240. (All reduced approximately one-fourth)

(15) Case 3: Focal necrosis, central necrotic arteriole, corpus callosum, × 300. (16) Case 5: Heart muscle, focal fatty degeneration (Sudan IV), × 405. (17) Case 3: Heart, vascular lesion, muscle necrosis, × 300. (18) Case 5: Heart, thrombosed vessels, perivascular lymphocyte infiltration, × 210. (19) Case 3: Heart, interstitial and perivascular infiltration, × 300. (All reduced approximately one-fourth)



(20) Case 5: Liver, Rickettsiae (?) in Kupffer cell, × 1,430. (21) Case 5: Liver, Rickettsiae (?) in Kupffer cell, × 1,430 (22) Case 5: Liver, margin of focal necrosis, × 210. (23) Case 5: Spleen, hyaline thrombosis in pulp, × 495. (24) Case 5: Spleen, follicular reticulum cell proliferation and necrosis, × 495. (25) Case 5: Spleen, lymphoid infiltration in pulp, × 495. (All reduced approximately one-fourth)



(26) Case 3: Kidney, congestion and lymphocyte infiltration in pyramid, × 300. (27) Case 5: Kidney, vascular thrombus and lymphocyte infiltration, × 240. (28) Case 5: Kidney, capillary thrombosis, perivascular infiltration, × 495. (29) Case 5: Testis, perivascular lymphocyte infiltration and hemorrhage, × 240. (All reduced approximately one-fourth)

similar character to that in the myocardium, accompanied by serous exudation, occurred in the epicardium in case 2, and here there was an occasional cell filled with minute, basophilic, sometimes paired, coccoid and occasionally bacillary cytoplasmic inclusions.

Wilson and Chowning (2) reported parenchymatous degeneraton, capillary distension with little extravasation, considerable round-cell infiltration, and, where the last was marked, "swelling of the muscle fiber nuclei and fragmentation." Anderson (3) found poor nuclear staining and granular, fragmented muscle fibers. Vascular and cellular infiltrative changes were comparatively slight in Le Count's (8) material, only leucocytic thrombi and small subendocardial hemorrhages being described. Wolbach's (9) case 3 showed focal areas of fine droplet fat deposition in the muscle fibers like that seen in two of our cases. Occasional mural endocardial thrombi were seen in his case 2 and beneath these and in his cases 3 and 5, about capillaries or interstitially, were foci of infiltration by macrophages, which were sometimes phagocytic, and fewer polymorphonuclears, lymphoid, and plasma cells. The epicardium of his cases 2 and 5 showed patchy infiltration of the same cellular type. In Pinkerton and Maxcy's (10) case the picture was identical with that seen in some of ours. Focal areas of fatty degeneration or of coagulative necrosis were not observed.

In typhus also vascular lesions have been reported (Ceelen (11), Wolbach (13)), perivascular cellular infiltration is noted (Nicol (13), Ceelen, Grzywo-Dabrowski (12), Wolbach (13)), areas of diffuse macrophage, lymphoid, and plasma cell infiltration are seen (Gruber (11), Grzywo-Dabrowski, Wolbach (13); the specificity of these is questioned by Ceelen) and foci of necrosis with polymorphonuclear invasion are noted (Wolbach (13)).

Great vessels.—Normal in two cases; in two there were in the adventitia, respectively, small, and extensive perivascular lymphocyte accumulations about the vasa vasorum, with, in the latter, some endothelial necrosis and perivascular hemorrhage. As the latter of these (case 2) was a boy of 9 years of age without other stigmata of syphilis, these lesions are probably assignable to spotted fever.

In Wolbach's (9) three cases the aorta showed no acute lesions either in the intima or in the vasa vasorum. Similarly negative findings were reported by Pinkerton and Maxcy (10).

In typhus, Grzywo-Dabrowski (12) and Ceelen (11) have noted respectively proliferative perivascular and endothelial lesions about the vasa vasorum of the aorta, and small perivascular nodules like those in syphilis but smaller in the adventitia and media. Wolbach (13) found slight perivascular infiltration in 3 of 34 cases and he and Nicol (13) found no lesions reminiscent of syphilis.

Lungs.—Generally there was more or less marked congestion with patches of alveolar hemorrhage and of serous exudate In four of the five cases there were foci of polymorphonuclear exudation into the alveoli, varying from scattered small groups of alveoli in cases 1 and 3 to definite nodular consolidation in cases 4 and 5. The exudate included polymorphonuclear leucocytes, red corpuscles and, more often marginally, vacuolated karyolytic large round cells. Fibrin was scanty and finely fibrillar in cases 4 and 5, absent in cases 1 and 3. Gram positive cocci were present in the pneumonic areas, chiefly in pairs, and in case 5 there were very numerous small Gram negative bacilli. Pus-filled bronchioles were present in cases 3, 4, and 5. Perivascular and septal lymphocyte infiltration of very moderate grade was seen in cases 1, 2, and 4

Capillary congestion and swelling was regularly present in Wilson and Chowning's (2) material. One case showed "considerable broncho-pneumonia." Le Count (8) noted occlusion of capillaries by leucocytes, but "no serious consequences resulted." The diffuse septal filling by phagocytic large mononuclear cells which was so prominent in Wolbach's (9) cases was absent in ours and does not appear to have been present in Ricketts and Le Count's (8) material. The pneumonia seen in Wolbach's (9) case 5 seems to have been very similar to that occurring in our cases, in that in it, too, the exudate was fibrin free, polymorphonuclear and alveolar epithelial in character. The broncho-pneumonia in Pinkerton and Maxcy's (10) case seems also to have been similar to that in our cases.

The frequency of broncho-pneumonic involvement in the eastern type of spotted fever is interesting, as is the uniformity of its type, though this lesion is probably a secondary complication. Broncho-pneumonia has also been a frequent finding in European typhus (Ceelen (11), Wolbach (13)).

Trachea and large bronchi.—Congestion of mucosa in one case, lymphocyte infiltration in another, normal in a third.

Tracheobronchitis is notoriously frequent in typhus (Ceelen (11)).

Thyroid.—Normal in the two cases studied.

Endothelial swelling and mural and occlusive thrombi with mural polymorphonuclear infiltration and perivascular polymorphonuclear and macrophage infiltration were noted in the small thyroid vessels of one of Wolbach's (9) two cases. Rickettsiae were numerous in swollen endothelia and in smooth muscle cells.

Wolbach (13) saw a thrombosed artery in 1 of 34 thyroids studied in European typhus; Grzywo-Dabrowski (12) found no lesions.

Thymus.—In case 2 the cortex was somewhat rarefied, but no focal lesions were noted.

Oesophagus.—Sections from the thyroid level were examined in cases 1 and 2. In both, perivascular lymphocyte infiltration was

seen in the mucosa; and in case 2, lymphocytes, plasma cells, and a few mast cells were seen among the mucous glands.

Liver.—The grade and character of the hepatic lesions were quite variable, cases 1 and 3 showing no significant lesions, cases 2 and 4 scattered clumps of lymphocytes in the parenchyma, with, in case 2, scattered minute hyaline thrombi and scattered swollen Kupffer cells with ingested red corpuscles and nuclear débris. Case 1 had a partly thrombosed cavernous hemangioma, the thrombosis being partly organized, partly recent and hyaline. In case 5 the lesions were so marked and of such interest as to merit a separate description. In this case there were numerous foci of centrolobular coagulative necrosis, sometimes confluent and partly surrounding the periportal areas. In these foci the cells were of about normal size, strongly oxyphil, and more or less karyolytic. In the surviving periportal zones the liver cells generally contained more or less fat in small globules. Kupffer cells both in necrotic foci and elsewhere were often swollen, sometimes phagocytic and sometimes contained minute rod-shaped cytoplasmic inclusions which stained clear blue with eosin and polychrome methylene blue, rarely showed polar granules, and measured 0.2 to 0.25 micron in width and 1.5 to 2 micra in length. (Figs. 20, 21.) Capillaries were moderately blood filled, sometimes occluded by hyaline thrombi in the focal necroses and less often elsewhere. (Fig. 22.)

Arterioles in the portal connective tissues rarely showed foci of mural necrosis and thrombosis.

Congestion, intracapillary leucocytosis, and parenchymatous and fatty degeneration were noted by Wilson and Chowning (2). Considerable blood pigment was present in some cases. Anderson (3) reported advanced fatty infiltration and full bile capillaries. Le Count (8) noted parenchymatous degeneration and in some cases evidence of biliary obstruction due to regressive changes in the liver cells. Occluded vessels with resultant necroses were also noted, but not specifically for man. In Wolbach's (9) four cases only a few scattered minute focal necroses were seen. Phagocytic macrophages and Kupffer cells were evidently more prominent than in our material, while the thromboses seen in two of our cases and in Le Count's material were absent. Periportal mononuclear cell accumulation and slight Kupffer cell "proliferation" were reported in Pinkerton and Maxcy's (10) case.

Kupffer cell swelling and phagocytic activity are seen also in typhus (Aschoff (11), Schmirke (11), Wolbach (13)). Nodules of lymphoid or other cells have been noted by Grzywo-Dabrowski (12), Fraenkel (11), Ceelen (11), and Wolbach (13). Thrombi in the capillaries and scattered necrotic cells were seen by Wolbach (13), while von Prowazek (11) observed centrolobular necroses.

Pancreas.—In two cases no lesions were present; in case 2 there was more or less interstitial hemorrhage, edema, lymphocyte, plasma cell, eosinophil, and neutrophil leucocyte infiltration with clumped and paired cocci in the infiltrated areas.

Wolbach's (9) three cases and Pinkerton and Maxcy's (10) case also showed no lesions in the pancreas. Significant lesions are usually absent in typhus; Wolbach (13) noted interstitial polymorphonuclear infiltration in two cases.

Spleen.—The splenic corpuscles were small and hypoplastic, showing central reticulum cell proliferation with much ingestion of nuclear débris only in one case. The pulp was regularly congested and to a quite variable degree infiltrated by more or less clumped lymphocytes and fewer large lymphoid and plasma cells, sometimes also polymorphonuclear and eosinophil leucocytes. In case 2 a few small areas, in case 5 more numerous foci of hyaline thrombosis were seen in the sinus and pulp spaces. More or less karyorrhexis was noted in the thrombosed areas. Areas of reticulum cell swelling were noted in the pulp in two cases, and pulp and follicular arteriolar endothelial swelling and proliferation in case 5, sometimes with thrombosis and endothelial necrosis. Occasional megakaryocytes were present in case 2. (See Figs. 23, 24, 25.)

Engorgement of the pulp by red cells and leucocytes was noted by Wilson and Chowning (2) with polymorphonuclear leucocyte infiltration of the splenic corpuscles and much free and phagocytosed blood pigment. The nature of the "pyroplasmata" described by them as numerous is not clear, but they may represent nuclear débris which has been plentiful in our cases. Besides diffuse hyperplasia Le Count (8) described focal clumping of polymorphonuclear leucocytes in the splenic pulp sinuses grading into minute focal necroses in both man and monkeys. These foci appear comparable to the foci of hyaline thrombosis and necrosis seen in some of our cases, though polymorphonuclear leucocytes participated to a less extent in our material. Le Count also found, as in our material, occasional cells resembling megakaryocytes. The large numbers of phagocytic macrophages in, and the intense engorgement of, the splenic pulp without thromboses or necroses described in Wolbach's (9) four cases contrast with the findings in Le Count's and our cases. This difference may possibly be due to the shorter course of most of Wolbach's cases as compared with ours. The duration of Ricketts and Le Count's six cases has not been reported. Thrombosis was not reported by Pinkerton and Maxcy (10), the spleen pulp showing only moderate congestion, "a predominance of mononuclear cells," some increased prominence of the reticulum cells, occasional small clumps of large mononuclear cells suggesting nodes, and patches of apparent occlusion of venous sinuses by endothelial proliferation.

Hyperaemia, phagocytosis of red cells, plasma cell infiltration of the pulp, hemorrhages, inflammatory changes in the Malpighian corpuscles, and rarely mural thrombi in sinusoids have been observed in typhus (Ceelen (11), Wolbach (13)), but necroses do not appear to have been observed, in contrast with spotted fever.

Lymph glands.—Peribronchial lymph glands were examined in cases 1 and 2, and mesenteric glands in case 2. One gland only in case 1 showed marginal sinus endothelial swelling. In case 2 both groups of glands were swollen and edematous, their sinus endothelia often swollen, and their sinuses contained numerous macrophages as well as red corpuscles in variable numbers. The macrophages were often vacuolated, sometimes fat laden, often phagocytic, and, in the mesenteric nodes, often in the process of coagulative necrosis. Some of the blood vessels in the mesenteric nodes contained hyaline or necrotic cellular thrombi. (This case showed a peritoneal reaction, *q. v.*).

Le Count (8) noted a hyperplasia in the lymph glands, and described in guinea pigs crowding of the sinuses by large phagocytic cells. Similar sinus endothelial swelling and packing of the sinuses of the lymph glands was observed by Wolbach (9), also occasionally showing phagocyte necrosis as in our case 2, but less marked. Polymorphonuclear leucocytes were also present in the sinuses in his cases, while blood vascular lesions were absent.

Crowding of lymph gland sinuses by macrophages and vascular thrombi were observed in the inguinal nodes in typhus cases, but not in the mesenteric glands by Wolbach, Todd, and Palfrey (13).

Bone marrow.—Marrow was obtained from the ribs, sternum, or vertebrae in cases 1, 2, and 4. Polymorphonuclear neutrophil leucocytes appeared increased in case 1, and a few capillaries in case 2 showed endothelial swelling and degeneration, rarely with thrombosis.

Le Count (8) found no focal lesions in the marrow of experimental animals, but examined no human material.

In typhus, increased myelopoietic activity in the femoral marrow was observed by Wolbach, Todd, and Palfrey (13); Grzywo-Dabrowski (12) reported perivascular nodes of plasma cells; while von Prowazek (11) reported degeneration and karyorrhexis of polynuclears and sometimes megakaryocytes. Vascular thrombosis was seen in one case by Wolbach (13).

Adrenals.—Small foci of lymphocyte infiltration, chiefly in the medulla, were seen in four of five cases. Vascular endothelial swelling and karyorrhexis were noted only in case 5, and there rarely. Cortical lipoid was decreased in cases 1, 2, and 5, and increased in case 4.

The vascular occlusions and focal necroses noted by Le Count (8) were not found in our material. On the other hand, Le Count did

not note the small medullary foci of lymphocyte infiltration seen in our material and in Wolbach's case 3. Wolbach (9) noted a similar, though irregular, decrease in lipoid in his cases 2 and 3, with foci of cortical necrosis and leucocyte invasion and patches of medullary lymphocyte and plasma cell infiltration in the latter. Vascular lesions were absent in all three cases.

Foci of cortical cell destruction and macrophage, lymphocyte, and plasma cell infiltration were noted in typhus by Grzywo-Dabrowski (12) and Wolbach, Todd, and Palfrey (13).

Kidneys.—There was moderate swelling and granular degeneration, slight, irregular fatty degeneration, and slight intratubular exudate in the convoluted tubules. Other acute lesions were absent in case 1, while the remaining four cases showed more or less numerous foci of dense, often perivascular, lymphocyte infiltration, some of which contained centrally small vessels with swollen or proliferating endothelia, in some with fatty degeneration, karyorrhexis, and central hyaline or necrotic cellular thrombi. Endothelial necrosis and thrombosis and pericapillary hemorrhages were present in two of the five cases. There was a moderately advanced arteriosclerotic nephritis in case 4. (Figs. 26, 27, 28.)

Anderson (3) reported minute hemorrhages in the cortex and beneath the capsule, and granular convoluted tubules with poor nuclear staining, containing casts and showing some desquamation. Wilson and Chowning (2) found congestion, cortical hemorrhages, many phagocytes and general acute parenchymatous degeneration. Le Count (8) noted vascular occlusions and necroses in the kidney, but did not describe the cellular infiltrations which were so prominent in our material. In Wolbach's (9) material there were some large mononuclear cell accumulation in the glomerular loops, and in one case some albuminous intratubular exudation, with slight fatty changes in the dilated convoluted tubules. Pinkerton and Maxcy's (10) case showed no lesions.

Perivascular small celled infiltration has been very frequently seen in typhus (Grzywo-Dabrowski (12), Ceelen (11), Wolbach (13), and others (11)), and Wolbach has noted capillary thrombi in such nodes.

Testes.—Testicle was obtained in all four male patients. The two adults (cases 1 and 4) showed more or less marked tubular degeneration and desquamation, with, in case 4, scattered perivascular foci of infiltration by lymphocytes and a few macrophages. Much more marked changes were present in the two boys (cases 2 and 5). In these there were intertubular congestion and more or less numerous hemorrhages, a few vessels showing endothelial swelling and, in case 5, hyaline or necrotic cellular thrombi and perivascular lymphocyte infiltration (Fig. 29). Occasional patches of mesothelial swelling and proliferation in the tunica vaginalis visceralis were seen in case 2.

Epididymis.—There were a few foci of perivascular lymphocyte infiltration in case 4, and in case 2, congestion, edema, hemorrhages, moderate, diffuse and denser perivascular infiltration by lymphocytes, plasma cells, macrophages and a few polymorphonuclears, and swollen endothelial cells which rarely contained a few minute deeply basophil rod-shaped inclusions. No significant changes appeared in case 1.

Prostate.—The prostate was examined only in case 4 and showed the usual changes of senile hypertrophy and a few small foci of lymphocyte infiltration which may or may not be significant.

Perivascular cell accumulation and multiplication, associated apparently with evidence of granulopoietic activity, was noted by Le Count (8) in the testis and epididymis of experimentally infected monkeys. One small group of capillaries in the tunica albuginea showed involvement of typhus type in Pinkerton and Maxcy's (10) case.

Perivascular nodes, diffuse interstitial lymphoid cell infiltration, and vascular thrombi have been noted in typhus by Schmorl (11), Ceelen (11), Grzywo-Dabrowski (12), and Wolbach, Todd, and Palfrey (13); but hemorrhage does not appear in these reports.

Uterus, tubes, and ovaries.—These organs in case 3 showed no significant changes. Nor are lesions found in European typhus (Grzywo-Dabrowski (12), Wolbach, Todd and Palfrey (13)).

Gastrointestinal tract.—The gastrointestinal tract was examined in detail only in case 2, which showed grossly a serofibrinous peritonitis. The stomach showed some lymphocyte infiltration about the bases of the peptic glands. Sections from the ileum, cecum, and colon showed no significant changes in the mucous membrane. The serosa showed more or less marked edema, mesothelial swelling, necrosis and fibrin exudation, and cellular infiltration by plasma cells, lymphocytes, macrophages, polymorphonuclears, and eosinophils in decreasing proportions, extending deepest into the muscularis and submucosa over the cecum. Various Gram positive and negative bacilli and Gram positive diplococci were present in the peritoneal exudate. The appendix, which had been removed earlier in the disease, was not available for study.

The character of the cellular exudate and the fact that somewhat similar reactions occur in the tunica vaginalis testis of guinea pigs infected with endemic typhus suggest that this peritonitis may be specific in origin, but with the obvious secondary infection present this is uncertain. The gross demonstration of serous exudations in the body cavities already referred to in the western type of spotted fever lends a certain amount of support to this view.

Wolbach (9) found only a single vascular lesion in an artery in the wall of the stomach in his case 2 and several partly thrombosed small vessels in case 3.

In European typhus, vascular lesions are rarely found (Wolbach, Todd, and Palfrey (13), fairly often (Bauer (11), Lubarsch (11), Ceelen (11), and Grzywo-Dabrowski (12)).

Voluntary muscles.—Moderate, irregular fatty degeneration was seen in the rectus femoris of case 1, swelling and hyaline degeneration of scattered fibers, and a few foci of pericapillary lymphocyte infiltration in the rectus abdominis of case 3.

In the muscles Wolbach (9) also described scattered hyaline degenerate fibers and vascular lesions. The latter were more severe than in our case 3, showing thrombi, destruction of the internal elastic laminae of arteries, polymorphonuclear and macrophage infiltration of the media, and numerous rickettsiae in endothelial and smooth muscle cells.

In European typhus similar vascular lesions and less often diffuse interstitial infiltration by lymphoid and plasma cells and eosinophils, as well as Zenker's degeneration, have been reported (Ceelen (literature) (11), Wolbach, Todd, and Palfrey (13)).

Skin.—Sections from one to three areas were studied in cases 1, 2, 3, and 4. The most frequent finding was pericapillary cellular infiltration, chiefly by lymphocytes and a few mast cells. Fewer capillaries presented a concentric adventitial hyperplasia. Endothelial swelling and multiplication to several layers were observed in two of the four cases, endothelial necrosis with hyaline thrombosis, and pericapillary hemorrhages, respectively, in one case each. Cell inclusions resembling rickettsiae were found in the endothelia and walls of small vessels in three cases. Arteriolar endothelial proliferation and obliteration was recorded only in case 4.

Anderson (3) reported capillary congestion and minute extravasations "in the rete extending into the stratum mucosum." Wilson and Chowning (2) noted capillary congestion and leucocytosis, and perivascular hemorrhages. Le Count (8) described cellular and agglutinative erythrocytic thrombi, and necroses and hemorrhages in the skin. These changes were apparently more extensive and advanced than in our material. Le Count considered the vascular lesions in Rocky Mountain spotted fever as beginning by leucocyte, lymphocyte, and macrophage accumulation within the vessels, agglutinated red cells and fibrin contributing later to the thrombosis. Endothelial swelling, degeneration and necrosis, concentric proliferation, and prominent perivascular cellular infiltration were not generally present, or not specifically noted. Foci of infarctive necrosis about occluded vessels appear to have been more prominent in his material than in ours, and perivascular hemorrhage was more frequent. The gangrenous changes seen by him in animals, which are probably of the same nature as those seen clinically in spotted fever in Idaho (Ricketts 1909), were not seen in our human material,

but have been observed in the scrotum in experimentally infected rabbits (unpublished data).

In Wolbach's (9) five cases vascular thrombosis by fibrin and large mononuclear cells which were often phagocytic were much more frequent than in our cases; the thrombi appear to have been more recent, as well preserved cells appeared in them, while these were represented by granular débris and nuclear fragments in our material; the arterial and venous mural infiltration by fibrin, large mononuclears and polymorphonuclears reported by him did not appear in our material; and the perivascular cellular infiltration in our material comprised chiefly lymphocytes and mast cells, while in his lymphoid cells, plasma cells, macrophages, and occasional eosinophils were seen about the vessels. The formation of granulomata in degenerating fatty tissue reported by him was absent in our material, as were the degenerative changes in the sweat glands. The thrombosis of the larger cutaneous arteries and veins so prominent in Wolbach's material was not evident in ours. These differences seem to indicate lesions of longer duration and of less local severity in our cases of eastern spotted fever. It should be noted also that rickettsiae seem to have been much more numerous and mast cells less so in his material than in ours.

The similarity of the skin lesions of European typhus to those of Rocky Mountain spotted fever is well known (9, 10, 13) and need not be discussed in detail.

Hypophysis.—In the three hypophyses studied, the pars anterior showed no focal lesions. Chromophobe cells appeared to predominate, but chromophil cells were moderately numerous.

The pars nervosa was studied only in two cases, showing in case 2 congestion, pericapillary fibroblast proliferation, and less often lymphocyte and plasma cell infiltration of capillary sheaths, and in case 4 an extensive area of rarefaction with proliferation of large bipolar glia cells and infiltration by large amoeboid and fusiform granule cells containing hemosiderin and hemofuscin.

Pineal gland.—In the one case studied (4), there were occasional thrombosed capillaries and a few foci of pericapillary lymphocyte infiltration.

Similar selective localization of vascular lesions in the posterior lobe of the hypophysis was reported in European typhus by Wolbach, Todd, and Palfrey (13).

Summary and Discussion

An account of the gross and microscopic pathology of the eastern type of Rocky Mountain spotted fever based on the study of five autopsies is presented.

Certain differences between the eastern and western forms of the disease and European typhus may be noted. Broncho-pneumonia of

greater or less extent is more frequent in the eastern type (in 5 of the 6 reported cases, as compared with 3 of 17 cases in the western type of the disease). Pneumonias have often been seen in typhus. Fatty changes in the liver seem to have been more frequent in the western type of disease, and splenomegaly appears to have been greater in that form. Scrotal gangrene has not so far been noted in the eastern type in man. Ecchymoses in the serous membranes and renal capsules have not been noted in the eastern form. Meningeal congestion has been more frequently noted in the eastern disease, and focal brain lesions of vascular degenerative and proliferative and focal gliotic characters have been constantly present in the eastern form as contrasted with their almost complete absence in the western type. The eastern type of spotted fever has shown in the brain an arteriolar thrombonecrosis with surrounding infarction which has not been specifically described in European typhus. Further study of the brain in the western type of spotted fever would seem to be indicated.

Vascular and diffuse cellular exudative lesions and focal necroses in the heart muscle have been more often observed in the eastern type of spotted fever than in the western, and the necroses are apparently more frequent than in European typhus. That both the eastern type of spotted fever and typhus give rise to lesions of the vasa vasorum of the aorta seems to be indicated, while the few cases of the western type of spotted fever in which the aorta has been studied have not shown such changes.

Capillary and sinus thrombosis and focal necroses in the liver and spleen have been noted in both varieties of spotted fever and seem to be more frequent than in European typhus, while reticulum cell swelling occurs in both diseases, with phagocytosis of erythrocytes more prominent in typhus. The reticulum cell-macrophage reaction in lymph nodes appears to have been more prominent in spotted fever than in typhus, and in the eastern type of spotted fever may go on to necrosis as in typhoid fever. The adrenal changes have been slight but fairly similar in character in typhus and spotted fever.

The focal vascular and cellular exudative reaction observed in the kidneys in the eastern type of spotted fever has occurred more often than in the western type, and the endovascular proliferation, degeneration, and thrombosis seem more prominent than have been reported in European typhus. The occurrence of focal exudative, hemorrhagic, and vascular lesions in the juvenile testis in the eastern type of spotted fever contrasts with the absence of these lesions in the western variety, but the male cases reported in that type have nearly all been adults. Similar vascular and cellular exudative lesions, but not hemorrhages or vascular necroses, are reported in European typhus.

Cutaneous hemorrhage seems to have been more prominent in the western type of spotted fever than in the eastern, in accord probably with its more acutely fatal course, and thrombonecrotic vessel changes were also relatively less frequent in the eastern type. Changes seen in the typhus exanthem seem also to have been more acute and severe than in the eastern type of spotted fever, but the more frequent vascular necroses, with medial involvement of larger vessels, of the western type of spotted fever are, according to Wolbach, Todd, and Palfrey, less prominent or absent in typhus.

References

(1) Wilson, L. B., and Chowning, W. M.: First biennial report of the Montana State board of health. Independent Publ. Co., Helena, Montana, 1903, pp. 25–91.

(2) Wilson, L. B., and Chowning, W. M.: Studies in pyroplasmosis hominis ("Spotted fever" or "Tick fever" of the Rocky Mountains). Jour. Infect. Dis., 1904, **1**, 31.

(3) Anderson, J. F.: Spotted fever (tick fever) of the Rocky Mountains. Hygienic Laboratory Bulletin No. 14. Gov't Printing Office, Washington, 1903.

(4) Anderson, J. F.: Spotted fever (tick fever) of the Rocky Mountains; a new disease. Second Biennial Report of the Montana State Board of Health. Independent Publ. Co., Helena, Montana, 1905.

(5) Stiles, C. W.: A zoological investigation into the cause, transmission, and source of Rocky Mountain "spotted fever." Hygienic Laboratory Bulletin No. 20. Gov't Printing Office, Washington, 1905.

(6) Ashburn, P. M.: Piroplasmosis hominis (?)—Spotted fever of Montana. Lancet Clinic, 1905, **54**, 481.

(7) Ricketts, H. T.: Some aspects of Rocky Mountain spotted fever as shown by recent investigations. Med. Record (1909), **76**, 842, *in* "Contributions to Medical Science by Howard Taylor Ricketts." Univ. Chicago Press, Chicago, 1911, p. 373.

(8) Le Count, E. R.: A contribution to the pathological anatomy of Rocky Mountain spotted fever. Jour. Infect. Dis., 1911, **8**, 421.

(9) Wolbach, S. B.: Studies on Rocky Mountain spotted fever. Jour. Med. Res., 1919, **41**, 1.

(10) Pinkerton, H., and Maxcy, K. F.: Pathological study of a case of endemic typhus in Virginia with demonstration of Rickettsia. Amer. Jour. Path., 1931, **7**, 95.

(11) Ceelen, W.: Die pathologische Anatomie des Fleckfiebers. Ergebn. d. allg. Path. u. path. Anat., 1919, **19**, 1 Abt., 307.

(12) Grzywo-Dabrowsky, W.: Untersuchungen über die pathologische Anatomie des Fleckfiebers. Virchows Arch. f. path. Anat. etc., 1918, **225**, 299.

(13) Wolbach, S. B., Todd, J. L., and Palfrey, F. W.: The etiology and pathology of typhus. Harvard Univ. Press, Cambridge, Mass., 1922.

(14) Krinitzky, S. I.: Veranderungen im zentrolen Nervensystem bei Tollweit. Virchows Arch. f. path. Anat. etc., 1920, **261**, 802.

(15) Badger, L. F., Dyer, R. E., and Rumreich, A. An infection of the Rocky Mountain spotted fever type. Identification in the eastern part of the United States. Pub. Health Rep., 1931, **46**, 463.

DEATH RATES IN A GROUP OF INSURED PERSONS

Rates for Principal Causes of Death for Month of September and First Nine Months of 1931

The accompanying tables, taken from the Statistical Bulletin for October, 1931, issued by the Metropolitan Life Insurance Co., present the mortality record of the industrial insurance department of the company for the first nine months of 1931 (total and by white and colored policyholders) and for the month of September, 1931. The rates are based on a strength of approximately 19,000,000 insured persons in the United States and Canada. In recent years the general death rate in this more or less selected group of persons has averaged about 72 per cent of the rate for the registration area of the United States.

FIRST NINE MONTHS OF 1931

With regard to the mortality in this group for the first nine months of 1931 the Bulletin states:

There is a fair prospect that the year 1931 will record a lower death rate than ever before in the United States and Canada; the state of the public health in the last quarter of the year will determine. The mortality record for the policyholders of the company shows that at the end of the third quarter the cumulative death rate was only three-quarters of 1 per cent higher than the previous minimum for the like period of any year—established only last year. So slight an adverse margin may be easily overcome during the final quarter.

The 1931 health record to date is in many respects the most remarkable of all the years. It is almost unbelievable that the United States and Canada could experience such excellent health in a year of severe business depression and widespread unemployment. Again, the year's remarkable record has been made in spite of a bad beginning. In January there was widespread prevalence of influenza, and the death rate from that disease rose sharply. So also did the mortality from the principal chronic diseases, namely, heart conditions, diabetes, cerebral hemorrhage, and nephritis, as invariably happens during an influenza epidemic. Increased death rates as compared with 1930 were recorded during February and March, and at the end of the first quarter there appeared to be small prospect that 1931 would rank as an exceptionally good health year. Beginning with the second quarter, however, a distinct change for the better was observed. The April death rate, with two exceptions, was the lowest ever registered for that month; in May, a new minimum mortality rate for that month was recorded, and the second quarter established a new low figure for that part of the year. Excellent health conditions continued during the third quarter, especially among the colored policyholders. The cumulative death rate now stands less than 1 per cent higher than the previous minimum. Among the policyholders living west of the Rocky Mountains and in Canada, 1931 to date has been the best health year on record.

Tuberculosis.—Foremost among the favorable developments of 1931 is a further decline (of 7½ per cent) in the tuberculosis death rate to a new minimal figure. If this drop is still in evidence at the end of the year, there will be recorded the largest year-to-year decrease registered for this disease in 10 years. Such improve-

ment is all the more remarkable in a year when unfavorable economic conditions would lead us to expect a rise in the mortality from tuberculosis.

Diphtheria.—The drop in the diphtheria death rate to a new minimum of 3.9 per 100,000 is another outstanding public health fact of 1931. This represents a decline of 34 per cent in a single year in the mortality from this former leader among the scourges of childhood. The diphtheria death rate is now about two-fifths of that recorded only 5 years ago, one-sixth of the figure registered 10 years ago, and one-seventh of the rate in 1911. The fight against diphtheria has been definitely won.

Other diseases.—Unless there are unfavorable developments in the final quarter of 1931, new low death rates will also be recorded for typhoid fever, diarrheal complaints, and puerperal conditions. The typhoid fever death rate has been reduced to a point where it is a negligible item in our mortality statistics; the mortality from infantile diarrhea has dropped 80 per cent in about two decades.

The "degenerative" diseases.—A small increase is shown in the mortality from heart disease. If this is still in effect at the end of the year, a new high point in the death rate will be reached. The increase this year is due, in large part, to the high mortality among cardiacs during the influenza outbreak of last winter. There has been a slight rise in the mortality from cerebral hemorrhage and a small drop in that from chronic nephritis.

Pneumonia.—There has been no rise in the pneumonia death rate thus far in 1931. This is unusual in a year with high mortality from influenza.

SOME UNFAVORABLE ASPECTS

Influenza.—The diseases which show important increases in mortality during the January–September period are influenza, cancer, diabetes, and poliomyelitis. Since the abatement of last winter's epidemic, influenza has exhibited about the normal mortality.

Cancer.—The mortality record for cancer is the most unfavorable item to date in the health record of 1931. We know of no explanation for the marked rise in the cancer death rate. It is true that, over a long period of years, an upward trend has been observed in the mortality from cancer, but no such decided rise (6.4 per cent) has been observed in any one previous year.

Diabetes.—The mortality from diabetes has increased nearly 12 per cent as compared with the corresponding period of 1930. The death rate for this disease has increased continuously since 1924; but the change from one year to the next has been larger in 1931 than ever before experienced among the industrial policyholders.

Death rates [1] *(annual basis) per 100,000 persons exposed, first nine months of 1929, 1930, and 1931, by white and colored policyholders*

[Metropolitan Life Insurance Co., industrial department]

Cause of death	Death rates, per 100,000 persons exposed [1]					
	White			Colored		
	January-September, 1931	January-September, 1930	January-September, 1929	January-September, 1931	January-September, 1930	January-September, 1929
All causes of death	815.8	800.2	869.6	1,500.8	1,560.7	1,608.0
Typhoid fever	1.5	1.6	1.9	4.8	5.1	4.8
Measles	4.0	3.7	3.9	2.0	2.5	1.5
Scarlet fever	3.6	3.0	3.0	1.6	.8	1.0
Whooping cough	3.7	4.7	5.7	3.3	5.3	10.7
Diphtheria	4.2	6.3	8.6	2.1	2.8	5.9
Influenza	20.1	12.6	44.1	55.3	39.1	92.8
Meningococcus meningitis	2.1	3.1	4.7	6.4	9.9	8.2
Tuberculosis (all forms)	58.9	64.3	70.1	214.8	227.2	225.5
Tuberculosis of respiratory system	52.1	55.7	61.8	188.9	197.6	200.2
Tuberculosis of the meninges, etc	2.9	3.9	3.7	6.1	6.9	5.6
Other forms of tuberculosis	3.3	4.8	4.5	19.8	22.8	19.7
Cancer	82.3	77.2	77.2	84.1	80.5	79.8
Diabetes	20.6	18.3	18.5	22.7	21.9	21.0
Alcoholism	2.7	2.8	3.0	3.7	4.9	4.8
Cerebral hemorrhage, apoplexy	53.9	52.4	[2] 51.4	119.2	123.2	[2] 104.0
Organic diseases of the heart	137.7	131.7	136.6	249.8	259.4	243.9
Total respiratory diseases	82.7	82.2	97.1	153.2	159.4	183.7
Bronchitis	2.9	3.3	3.6	3.9	5.0	5.3
Broncho-pneumonia	31.3	30.5	37.1	42.6	45.0	55.4
Pneumonia (lobar and undefined)	41.3	41.1	48.4	95.1	96.9	109.8
Other diseases of respiratory system	7.2	7.3	8.0	11.6	12.0	13.2
Diarrhea and enteritis	15.3	19.3	20.5	15.0	19.3	22.2
Under 2 years	12.4	14.9	16.5	8.0	11.2	14.0
2 years and over	2.9	4.4	4.1	7.0	8.1	8.2
Acute nephritis	3.4	3.2	3.6	11.6	14.1	14.8
Chronic nephritis	58.4	59.4	61.8	132.0	138.3	129.5
Total puerperal state	10.5	11.7	12.6	17.5	19.2	22.9
Total external causes	71.6	74.9	74.2	105.1	117.1	116.3
Suicides	10.3	10.1	9.0	6.4	6.7	6.0
Homicides	3.9	3.4	2.9	28.3	30.0	30.1
Accidental and unspecified violence	60.4	61.4	62.2	70.5	80.3	80.3
Automobile accidents	20.9	20.0	19.1	22.8	20.7	19.7
All other and ill-defined causes of death	175.5	167.6	171.2	296.6	310.8	312.6

[1] All figures in this table include insured infants under 1 year of age. The rates for 1931 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.
[2] Rate not comparable with that for later years.

SEPTEMBER, 1931

Health conditions in this group during September, 1931, were about the same as last year, the death rate being practically the same (7.97 per 1,000 this year as compared with 7.92 last year). As compared with the corresponding month last year, the epidemic diseases of childhood are generally lower, while typhoid fever and the principal chronic diseases show increases. The bulletin especially points out the lower rate for cancer and the high rate for automobile fatalities. September is the first month of this year to have a lower cancer death rate than the corresponding period of last year, while the automobile mortality rate is the highest yet recorded for September of any year, and with one exception it is the highest for any month in the records of the company.

Death rates (annual basis) per 100,000 for principal causes of death

[Industrial department, Metropolitan Life Insurance Co.]

Cause of death	Annual death rate per 100,000 lives exposed [1]				
	September, 1931	August, 1931	September, 1930	Cumulative, January to September	
				1931	1930
Total, all causes	797.8	735.5	792.9	898.3	891.7
Typhoid fever	4.7	3.2	4.1	1.9	2.0
Measles	.4	.7	.6	3.8	3.6
Scarlet fever	1.2	1.7	1.1	3.4	2.7
Whooping cough	4.1	4.2	4.6	3.7	4.8
Diphtheria	2.2	1.9	2.7	3.9	5.9
Influenza	4.5	4.6	5.6	24.3	15.8
Tuberculosis (all forms)	69.5	63.5	73.7	77.7	84.0
Tuberculosis of respiratory system	62.0	55.7	64.8	68.5	72.8
Cancer	79.4	76.1	79.9	82.6	77.6
Diabetes mellitus	17.8	16.9	16.0	20.9	18.7
Cerebral hemorrhage	55.9	49.3	55.2	61.8	60.9
Organic diseases of heart	129.7	118.3	123.2	151.2	147.1
Pneumonia (all forms)	32.2	27.6	35.0	80.4	80.0
Other respiratory diseases	7.6	7.4	8.9	10.8	11.5
Diarrhea and enteritis	32.5	27.1	40.7	15.3	19.3
Bright's disease (chronic nephritis)	61.2	51.9	59.9	67.2	68.9
Puerperal state	9.8	9.1	10.5	11.4	12.6
Suicides	10.4	9.1	9.6	9.8	9.7
Homicides	6.6	7.5	7.5	6.8	6.6
Other external causes (excluding suicides and homicides)	63.4	70.2	65.4	61.6	63.7
Traumatism by automobiles	25.7	22.6	24.0	21.1	20.1
All other causes	204.7	185.0	188.6	199.9	196.3

[1] All figures in this table include insured infants under 1 year of age. The rates for 1931 are subject to slight correction, since they are based on provisional estimates of lives exposed to risk.

DEATHS DURING WEEK ENDED NOVEMBER 7, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended November 7, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Nov. 7, 1931	Corresponding week, 1930
Policies in force	74,329,360	75,344,536
Number of death claims	11,783	11,918
Death claims per 1,000 policies in force, annual rate	8.3	8.2
Death claims per 1,000 policies, first 45 weeks of year, annual rate	9.7	9.6

Deaths [1] from all causes in certain large cities of the United States during the week ended November 7, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Nov. 7, 1931				Corresponding week, 1930		Death rate [2] for the first 45 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,338	10.7	627	[4] 49	11.7	729	11.9	11.9
Akron	32	6.5	3	30	7.8	1	7.7	7.9
Albany [5]	33	13.3	1	20	19.6	1	13.9	14.8
Atlanta [6]	68	12.8	5	51	12.9	4	14.9	15.6
White	31	8.8	2	32	11.5	1	11.6	11.6
Colored	37	20.7	3	86	15.5	3	21.6	23.5
Baltimore [5] [6]	223	14.3	17	58	15.8	43	14.3	14.0
White	162	12.7	7	30	14.2	31	13.0	12.7
Colored	61	21.7	10	156	23.6	12	20.2	20.0
Birmingham [6]	66	12.8	1	10	14.7	9	13.3	13.6
White	32	10.0	0	0	11.9	3	10.2	10.1
Colored	34	17.3	1	24	19.3	6	18.3	19.3
Boston	205	13.6	19	54	14.7	20	14.2	14.1
Bridgeport	35	12.4	6	100	11.0	5	11.1	10.9
Buffalo	133	11.9	10	41	10.6	9	13.0	12.9
Cambridge	23	10.5	2	40	7.3	1	12.0	11.8
Camden	34	14.9	3	52	14.9	5	14.1	13.5
Canton	32	15.6	0	0	10.4	0	10.1	10.0
Chicago [5]	566	8.5	33	29	9.5	46	10.6	10.4
Cincinnati	131	14.9	17	102	15.9	9	15.9	15.5
Cleveland	190	10.9	14	41	11.4	23	11.2	11.1
Columbus	73	12.9	2	20	15.7	6	13.5	15.5
Dallas [6]	71	13.6	10		13.7	12	11.2	11.4
White	53	12.2	7		10.1	6	9.8	10.4
Colored	18	19.8	3		31.1	6	17.7	16.3
Dayton	35	8.8	5	70	10.6	2	11.8	10.7
Denver	66	11.8	4	39	15.7	14	13.8	14.8
Des Moines	19	6.9	2	35	11.7	0	11.0	11.7
Detroit	238	7.5	27	43	7.6	36	8.2	9.3
Duluth	30	15.4	1	25	10.8	0	11.2	11.4
El Paso	32	15.9	4		14.7	9	15.4	17.2
Erie	16	7.1	3	56	10.8	1	10.4	11.2
Fall River [5] [7]	26	11.8	2	45	10.0	4	11.1	11.7
Flint	26	8.3	8	102	11.2	3	6.9	9.2
Fort Worth [6]	27	8.4	1		10.5	3	10.7	10.9
White	23	8.6	1		11.4	3	10.3	10.3
Colored	4	7.7	0		5.9	0	12.8	13.6
Grand Rapids	30	9.1	1	15	8.9	4	9.1	10.2
Houston [6]	63	10.6	3		12.4	7	11.0	12.1
White	51	11.7	3		12.5	2	10.2	10.7
Colored	12	7.5	0		12.0	5	13.2	15.7
Indianapolis [6]	88	12.4	10	82	11.1	3	13.7	14.5
White	68	10.9	6	56	10.7	2	13.3	13.6
Colored	20	23.1	4	268	14.1	1	17.1	21.7
Jersey City	56	9.2	8	71	11.7	7	11.3	11.3
Kansas City, Kans [6]	38	16.1	4	82	12.0	4	12.7	11.7
White	30	15.7	4	98	12.1	3	12.0	11.0
Colored	8	17.8	0	0	11.4	1	15.6	14.8
Kansas City, Mo	87	11.1	4	30	13.1	13	13.0	13.3
Knoxville [6]	36	17.2	5	107	10.8	1	12.4	13.5
White	31	17.7	4	95	9.4	1	11.5	12.6
Colored	5	14.6	1	204	18.1	0	16.6	17.8
Long Beach	28	9.6	2	48	10.5	2	9.8	9.9
Los Angeles	261	10.3	12	35	11.6	22	10.6	11.0
Louisville [6]	73	12.3	10	86	13.0	4	14.0	13.6
White	54	10.8	6	59	9.8	3	12.6	12.1
Colored	19	20.8	4	265	30.7	1	22.0	21.6
Lowell [7]	20	10.4	0	0	13.5	1	12.7	13.4
Lynn	15	7.6	1	26	7.1	2	9.4	10.3
Memphis [6]	81	16.3	10	106	15.8	13	16.6	17.0
White	30	12.7	4	67	15.6	7	13.6	13.2
Colored	42	22.1	6	174	16.1	6	21.5	23.1
Miami [6]	27	12.5	1	25	8.9	2	11.7	10.9
White	18	10.8	0	0	7.9	0	10.8	9.0
Colored	9	18.5	1	88	12.4	2	15.0	15.3

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended November 7, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Nov. 7, 1931				Corresponding week, 1930		Death rate [2] for the first 45 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	105	9.4	1	4	10.3	15	9.2	9.7
Minneapolis	74	8.1	7	45	11.7	15	11.1	10.7
Nashville [6]	43	14.4	4	60	18.3	12	12.8	16.6
White	37	17.1	4	80	17.3	8	11.4	14.0
Colored	6	7.3	0	0	23.7	4	23.1	23.4
New Bedford [7]	13	8.3	4	106	10.7	1	12.1	11.0
New Haven	26	8.3	2	38	13.1	1	12.4	12.7
New Orleans [6]	165	18.4	16	88	16.2	19	16.8	17.3
White	99	15.5	9	74	14.0	10	12.6	14.3
Colored	66	25.5	7	114	21.8	9	24.6	24.9
New York	1,232	9.2	121	51	10.1	119	11.1	10.8
Bronx Borough	102	6.3	9	20	7.9	12	8.1	7.9
Brooklyn Borough	484	9.8	75	79	9.4	45	10.2	9.8
Manhattan Borough	470	13.5	28	48	14.5	49	16.7	16.0
Queens Borough	129	5.8	6	16	7.2	12	7.2	7.0
Richmond Borough	47	15.0	3	54	9.5	1	13.7	14.1
Newark, N. J.	81	9.5	7	37	10.8	8	11.5	12.0
Oakland	62	11.1	4	51	10.0	4	10.5	10.9
Oklahoma City	35	9.3	1	14	8.6	5	10.7	10.6
Omaha	54	13.0	4	45	14.6	5	13.8	13.6
Paterson	37	13.9	4	69	8.3	0	13.3	12.2
Peoria	26	9.6	6	158	15.3	3	12.5	12.3
Philadelphia	417	11.1	35	51	12.1	36	12.9	12.6
Pittsburgh	187	14.4	22	76	15.5	19	14.4	13.8
Portland, Oreg.	75	12.7	5	61	11.4	3	11.6	12.1
Providence	55	11.3	3	28	14.0	3	12.7	12.9
Richmond [6]	54	15.3	4	58	16.2	10	15.4	14.8
White	35	13.9	3	66	12.8	4	13.0	12.1
Colored	19	18.7	1	43	24.6	6	21.5	21.5
Rochester	60	9.4	4	36	14.4	6	11.8	11.6
St. Louis	216	13.6	27	91	14.1	16	15.0	14.1
St. Paul	47	8.9	0	0	11.9	5	10.5	10.1
Salt Lake City [5]	31	11.3	5	74	12.6	7	12.0	12.4
San Antonio	54	11.7	8		11.6	8	14.2	16.1
San Diego	49	16.3	1	20	12.9	1	13.5	14.3
San Francisco	138	11.1	0	0	17.3	3	13.0	13.0
Schenectady	22	11.9	3	88	8.2	0	10.7	11.2
Seattle	82	11.5	1	9	10.8	2	11.3	10.8
Somerville	20	9.9	1	37	9.0	1	8.8	9.7
South Bend	18	8.7	1	25	11.4	2	8.0	8.9
Spokane	29	13.0	3	78	15.3	1	12.3	12.5
Springfield, Mass.	28	9.6	3	46	11.1	4	11.6	12.1
Syracuse	46	11.3	4	47	14.9	2	11.5	11.6
Tacoma	30	14.5	3	77	10.7	1	12.2	12.5
Toledo	59	10.4	7	64	12.7	5	11.9	12.7
Trenton	31	13.1	2	35	16.9	7	16.4	16.6
Utica	23	11.7	3	78	16.9	3	14.1	14.9
Washington, D. C. [6]	144	15.3	17	94	16.2	15	15.9	15.1
White	90	13.2	8	65	14.4	10	13.6	12.9
Colored	54	20.9	9	155	21.1	5	21.9	20.8
Waterbury	16	8.3	3	90	8.3	0	9.6	9.4
Wilmington, Del. [7]	28	13.7	3	65	10.8	3	13.9	14.3
Worcester	35	9.3	6	82	10.1	4	12.0	12.6
Yonkers	13	4.9	0	0	7.7	2	8.3	8.1
Youngstown	25	7.5	1	14	8.6	2	10.0	10.2

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans. 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 29; Richmond, 29; and Washington, D. C., 27.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

[These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers]

Reports for Weeks Ended November 14, 1931, and November 15, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 14, 1931, and November 15, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930
New England States:								
Maine	3	7			127	15	0	1
New Hampshire	4				4		0	0
Vermont	17	3			21	11	0	0
Massachusetts	65	59	5	2	72	150	1	3
Rhode Island	8	6			165		0	0
Connecticut	6	9	3	1	26	67	0	1
Middle Atlantic States:								
New York	162	105	[1] 7	[1] 25	175	146	11	8
New Jersey	35	52	15	5	22	81	3	4
Pennsylvania	132	127			250	257	4	6
East North Central States:								
Ohio	210	86	27	22	24	17	1	6
Indiana	80	52	6	7	27	93	2	3
Illinois	140	162	5	3	111	91	4	9
Michigan	34	86			230	45	2	3
Wisconsin	28	19	20	21	21	112	0	6
West North Central States:								
Minnesota	18	16	1	2	17	17	1	2
Iowa	30	10			4	1	3	0
Missouri	95	76	319	7		247	3	2
North Dakota	1	5					1	5
South Dakota	8	6	1		80	2	0	0
Nebraska	26	16	1		10	5	0	0
Kansas	68	27		1	25	4	1	2
South Atlantic States:								
Delaware	42	4					0	0
Maryland [2]	69	33	12	17	5	2	1	0
District of Columbia	6	6		1		4	2	2
West Virginia	64	21	1	34	127	10	1	0
North Carolina	147	134	31	5	15	5	4	4
South Carolina	46	57	361	547	4		0	1
Georgia	52	36	35	107	7	18	0	1
Florida	21	18	1	7	23	10	0	0

[1] New York City only.

[2] Week ended Friday.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 14, 1931, and November 15, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930
East South Central States.								
Kentucky	162	--------	--------	--------	--------	36	0	0
Tennessee	143	61	37	37	4	13	1	3
Alabama [3]	74	118	23	30	--------	43	5	2
Mississippi	93	53	--------	--------	--------	--------	1	4
West South Central States.								
Arkansas	74	19	1	21	13	2	0	0
Louisiana	55	30	11	11	1	1	5	2
Oklahoma [4]	135	58	18	44	5	14	0	1
Texas	82	61	6	10	6	26	2	0
Mountain States:								
Montana	--------	1	2	--------	54	1	0	3
Idaho	6	1	--------	--------	1	7	2	1
Wyoming	--------	--------	--------	--------	2	1	0	0
Colorado	9	10	--------	--------	6	46	1	0
New Mexico	20	3	--------	--------	--------	8	1	1
Arizona	30	5	3	3	3	29	2	0
Utah [2]	--------	1	4	6	1	--------	0	1
Pacific States:								
Washington	11	10	--------	--------	26	10	2	4
Oregon	--------	3	34	7	7	32	0	0
California	132	61	42	27	104	94	5	5

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930
New England States:								
Maine	8	3	31	20	0	0	5	13
New Hampshire	0	1	7	1	0	0	0	0
Vermont	0	0	14	1	0	0	0	0
Massachusetts	11	14	218	164	0	0	3	10
Rhode Island	1	0	14	18	0	0	0	0
Connecticut	9	2	35	38	0	0	4	3
Middle Atlantic States:								
New York	52	16	390	329	11	1	21	24
New Jersey	14	3	121	120	0	0	6	9
Pennsylvania	15	7	401	393	0	0	64	31
East North Central States:								
Ohio	3	52	586	435	6	58	53	27
Indiana	0	8	89	161	6	43	10	15
Illinois	27	15	315	376	6	14	21	16
Michigan	12	10	157	239	28	54	14	10
Wisconsin	10	13	61	93	10	3	4	7
West North Central States:								
Minnesota	27	11	51	56	1	9	4	5
Iowa	9	10	60	70	21	13	6	4
Missouri	0	4	92	95	3	3	19	10
North Dakota	0	2	16	9	29	11	8	3
South Dakota	4	8	21	7	2	13	3	2
Nebraska	2	15	33	29	3	24	0	2
Kansas	1	10	84	57	3	13	5	4
South Atlantic States:								
Delaware	0	0	9	17	0	0	1	2
Maryland [2]	1	1	103	57	0	0	30	40
District of Columbia	0	0	21	18	0	0	2	1
West Virginia	1	1	59	33	1	4	37	28
North Carolina	1	0	167	143	0	0	19	8
South Carolina	3	2	26	19	0	4	6	26
Georgia	0	0	37	63	0	0	18	15
Florida	1	0	5	12	0	0	7	0

[2] Week ended Friday.
[3] Typhus fever, 1931, 1 case in Alabama.
[4] Exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 14, 1931, and November 15, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930	Week ended Nov. 14, 1931	Week ended Nov. 15, 1930
East South Central States:								
Kentucky	3	0	104	66	2	1	49	15
Tennessee	1	1	93	71	4	4	37	32
Alabama [3]	2	3	70	77	1	0	28	42
Mississippi	1	0	51	26	2	0	10	20
West South Central States:								
Arkansas	1	0	31	8	0	19	15	33
Louisiana	0	0	47	30	0	1	25	31
Oklahoma [4]	0	0	53	46	1	0	23	32
Texas	1	3	47	41	2	15	7	17
Mountain States:								
Montana	5	0	16	32	2	1	2	2
Idaho	0	1	3	11	0	1	3	0
Wyoming	0	2	6	5	0	0	0	1
Colorado	0	4	47	34	1	2	9	7
New Mexico	0	1	13	5	0	0	7	5
Arizona	0	1	6	0	0	2	1	0
Utah [2]	0	0	7	10	0	0	0	0
Pacific States.								
Washington	3	0	64	38	12	14	3	9
Oregon	1	0	17	6	4	17	4	2
California	5	44	146	91	4	11	12	12

[2] Week ended Friday.
[3] Typhus fever, 1931, 1 case in Alabama.
[4] Exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July, 1931										
Delaware					96		0		0	
August, 1931										
Delaware					5				0	
September, 1931										
Delaware					1				0	
Mississippi	3	534	315	6,230	8	492	8	106	16	169
October, 1931										
Delaware					2				0	
Indiana	11	270	15		77		19	293	31	71
Iowa	4	76	2	1	16		44	119	73	25
Maine [1]		17	10		346		44	64	0	36
New Hampshire		15					13	27	0	2
North Dakota	3	21			21		9	44	17	24
Porto Rico		43	115	4,551	58	4			0	19
Wyoming	3	2	1		1		1	17	1	1

[1] Report of typhus fever in Maine in September, published in Public Health Reports dated Oct. 23, was in error. The disease was typhoid fever.

July, 1931

Delaware:	Cases
Mumps	3
Undulant fever	1
Whooping cough	39

August, 1931

Delaware:	
Chicken pox	3
Mumps	11
Whooping cough	24

September, 1931

Chicken pox:	
Delaware	2
Mississippi	162
Dengue:	
Mississippi	12
Dysentery (amebic):	
Mississippi	41
Hookworm disease:	
Mississippi	206
Mumps:	
Delaware	11
Mississippi	42
Ophthalmia neonatorum:	
Mississippi	8
Puerperal septicemia:	
Mississippi	16
Trachoma:	
Mississippi	9
Whooping cough:	
Delaware	31
Mississippi	266

October, 1931

	Cases
Chicken pox:	
Delaware	3
Indiana	120
Iowa	126
Maine	50
North Dakota	35
Porto Rico	5
Wyoming	29
Colibacillosis:	
Porto Rico	1
Conjunctivitis:	
Maine	3
Dysentery:	
Iowa	2
Porto Rico	68
Filariasis:	
Porto Rico	14
Framboesia:	
Porto Rico	1
German measles:	
Iowa	2
Maine	9
Impetigo contagiosa:	
Indiana	104
Iowa	10
Leprosy:	
Porto Rico	1
Lethargic encephalitis:	
Maine	1
Mumps:	
Delaware	11
Indiana	44
Iowa	19
Maine	8
North Dakota	54
Porto Rico	4
Wyoming	7
Ophthalmia neonatorum:	
Maine	1
Porto Rico	14
Paratyphoid fever:	
Maine	3
Porto Rico	3
Puerperal septicemia:	
Porto Rico	3
Scabies:	
North Dakota	1
Septic sore throat:	
Iowa	1
Maine	2
Tetanus:	
Iowa	1
Porto Rico	4
Tetanus, infantile:	
Porto Rico	4
Trachoma:	
Porto Rico	7
Tularaemia.	
Indiana	1
Iowa	1
Undulant fever:	
Indiana	8
Iowa	4
Vincent's angina:	
Iowa	3
Maine	11
North Dakota	50
Whooping cough:	
Delaware	25
Indiana	95
Iowa	61
Maine	36
North Dakota	89
Porto Rico	212
Wyoming	8

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 93 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,180,000. The estimated population of the 88 cities reporting deaths is more than 31,800,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended November 7, 1931, and November 8, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	2,735	1,769	
93 cities	601	518	927
Measles:			
45 States	1,572	1,321	
93 cities	250	350	
Meningococcus meningitis:			
46 States	57	82	
93 cities	29	26	
Poliomyelitis:			
46 States	307	291	
Scarlet fever.			
46 States	3,451	3,301	
93 cities	1,081	1,049	834
Smallpox:			
46 States	221	236	
93 cities	11	13	8
Typhoid fever:			
46 States	553	699	
93 cities	75	66	71
Deaths reported			
Influenza and pneumonia:			
88 cities	576	663	
Smallpox:			
88 cities	0	0	

City reports for week ended November 7, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	1	1		0	1	0	2
New Hampshire:								
Concord	0	0	0		0	0	0	0
Nashua	0	1	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	1	0
Burlington	0	1	0		0	27	0	0

City reports for week ended November 7, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
NEW ENGLAND—con.								
Massachusetts:								
Boston	27	27	24	5	4	5	4	11
Fall River	6	3	3		0	0	1	1
Springfield	2	5	1		0	0	4	1
Worcester	8	6	0		0	1	52	2
Rhode Island:								
Pawtucket	0	1	0		0	0	0	0
Providence	11	8	6		0	60	3	3
Connecticut:								
Bridgeport	1	4	0		1	0	1	5
Hartford	2	4	0		0	0	10	1
New Haven	9	0	0	1	0	0	2	2
MIDDLE ATLANTIC								
New York:								
Buffalo	13	12	4		0	1	6	19
New York	60	127	46	5	7	24	22	134
Rochester	5	3	3		0	4	4	2
Syracuse	15	2	0		0	1	1	0
New Jersey:								
Camden	5	7	4		2	0	0	5
Newark	13	14	1	3	0	2	2	7
Trenton	1	2	1		1	0	1	2
Pennsylvania:								
Philadelphia	33	59	5	5	4	8	9	26
Pittsburgh	36	25	8	4	4	20	38	44
Reading	26	2	0		0	1	0	1
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	3	11	7		2	0	0	14
Cleveland	31	34	9	8	0	1	23	13
Columbus	1	5	19	1	1	0	1	4
Toledo	27	9	5	1	0	0	0	5
Indiana:								
Fort Wayne	0	4	7		0	0	0	2
Indianapolis	9	12	11		0	0	8	9
South Bend	0	2	0		0	0	0	2
Terre Haute	4	2	2		0	0	0	2
Illinois:								
Chicago	54	107	60	7	4	18	6	36
Peoria	13		10		0	0	0	3
Springfield	1	1	5		0	0	0	1
Michigan:								
Detroit	22	64	34		0	4	1	14
Flint	18	4	1		0	2	9	3
Grand Rapids	2	2	0		0	0	0	0
Wisconsin:								
Kenosha	4	1	0		0	3	5	0
Madison	1	1	2		0	0	2	0
Milwaukee	21	14	3	1	1	1	18	6
Racine	7	2	1		0	0	5	0
Superior	1	0	0		0	0	11	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	12	0	0		0	0	0	1
Minneapolis	43	26	9		0	7	25	2
St. Paul	21	9	0		1	0	1	1
Iowa:								
Davenport	8	3	0			0	0	
Des Moines	2	2	1			0	0	
Sioux City	6	2	1			0	1	
Waterloo	12	0	0			0	0	
Missouri:								
Kansas City	7	8	13		0	0	0	6
St. Joseph	0	0	5		0	0	0	2
St. Louis	8	41	23	2		0	3	7
North Dakota:								
Fargo	1	0	0		0	1	0	0
Grand Forks	0	0	0			0	0	

City reports for week ended November 7, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
WEST NORTH CENTRAL—continued								
South Dakota:								
Aberdeen	12	0	0	--	--	30	0	--
Nebraska:								
Omaha	16	11	17	--	0	0	0	5
Kansas:								
Topeka	0	2	1	1	1	0	0	2
Wichita	4	3	12	--	0	0	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	3	0	--	0	0	0	4
Maryland:								
Baltimore	14	22	10	3	0	1	23	17
Cumberland	3	0	0	--	0	0	0	3
Frederick	0	1	0	--	0	0	0	0
District of Columbia:								
Washington	1	16	11	--	0	1	0	10
Virginia:								
Lynchburg	0	3	3	--	0	0	0	0
Norfolk	1	3	3	1	0	0	0	3
Richmond	0	21	27	--	0	0	0	1
Roanoke	0	5	9	--	0	0	0	1
West Virginia:								
Charleston	11	3	1	--	0	0	0	0
Wheeling	3	0	0	--	0	0	0	2
North Carolina:								
Raleigh	1	3	1	--	0	1	0	0
Wilmington	1	1	0	--	0	0	0	3
Winston-Salem	0	6	8	--	0	1	0	1
South Carolina:								
Charleston	2	1	1	15	0	0	0	2
Columbia	1	2	1	--	0	1	0	5
Greenville	0	2	0	--	0	0	0	0
Georgia:								
Atlanta	0	9	10	6	2	1	0	7
Brunswick	0	0	0	--	0	0	2	0
Savannah	0	2	2	10	0	0	0	2
Florida:								
Miami	0	1	2	--	0	8	0	1
Tampa	0	2	8	--	0	0	0	1
EAST SOUTH CENTRAL								
Kentucky:								
Covington	--	2	--	--	--	--	--	--
Tennessee:								
Memphis	5	10	19	--	0	0	0	9
Nashville	1	3	0	--	0	1	0	1
Alabama:								
Birmingham	1	7	15	1	0	0	0	5
Mobile	0	2	2	2	0	0	0	3
Montgomery	0	3	1	--	--	1	0	--
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	2	5	--	--	0	0	--
Little Rock	0	2	10	--	0	0	0	0
Louisiana:								
New Orleans	0	13	11	2	4	0	0	10
Shreveport	8	1	1	--	0	6	2	2
Oklahoma:								
Tulsa	0	5	15	--	--	0	0	--
Texas:								
Dallas	2	19	16	2	1	2	0	1
Fort Worth	2	6	6	--	0	0	0	0
Galveston	0	1	1	--	0	0	0	2
Houston	0	8	14	--	0	0	0	1
San Antonio	0	4	2	--	0	0	0	4

City reports for week ended November 7, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
MOUNTAIN								
Montana:								
Billings		0						
Great Falls	0	0	0		0	2	0	3
Helena	1	0	0		0	12	0	0
Missoula	0	0	3		0	0	0	0
Idaho:								
Boise	1	0	0		0	0	0	1
Colorado:								
Denver	43	10	2		2	1	3	6
Pueblo		1						
New Mexico:								
Albuquerque	5	0	5		0	0	0	0
Arizona:								
Phoenix	0	0	3		0	0	0	0
Utah:								
Salt Lake City	21	3	0		0	0	1	1
Nevada:								
Reno	0	0	0		0	1	0	2
PACIFIC								
Washington:								
Seattle	0	5	3			26	12	
Spokane		2						
Tacoma	4	4	1		0	1	11	4
Oregon:								
Portland	29	9	0	3	3	1	8	9
Salem	2	0	0	1	0	0	0	0
California:								
Los Angeles	10	35	44	24	2	5	6	9
Sacramento	1	2	2	1	0	17	0	3
San Francisco	28	14	1	3	0	4	1	6

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	2	6	0	0	0	2	1	0	0	2	24
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	6
Nashua	0	0	0	0	0	0	0	1	0	0	
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	4	2
Burlington	0	0	0	0	0	0	0	0	0	0	8
Massachusetts:											
Boston	45	32	0	0	0	7	2	0	0	8	205
Fall River	3	8	0	0	0	3	0	2	0	0	26
Springfield	5	2	0	0	0	2	0	0	0	2	24
Worcester	9	19	0	0	0	1	0	0	0	5	35
Rhode Island:											
Pawtucket	0	0	0	0	0	0	0	0	0	0	13
Providence	7	11	0	0	0	3	0	0	0	3	55
Connecticut:											
Bridgeport	6	5	0	0	0	2	0	2	0	2	35
Hartford	4	1	0	0	0	1	0	0	0	2	40
New Haven	2	0	0	0	0	0	0	0	0	0	26
MIDDLE ATLANTIC											
New York:											
Buffalo	18	24	0	0	0	12	1	1	0	17	131
New York	73	75	0	0	0	65	17	13	0	110	1,252
Rochester	5	29	0	0	0	3	1	2	0	8	57
Syracuse	5	11	0	0	0	1	0	4	0	14	48

City reports for week ended November 7, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MIDDLE ATLANTIC—continued											
New Jersey:											
Camden	3	5	0	0	0	1	0	0	0	7	34
Newark	9	11	0	0	0	6	1	2	0	61	86
Trenton	2	3	0	0	0	5	1	2	0	2	31
Pennsylvania											
Philadelphia	50	73	0	0	0	23	6	1	0	106	417
Pittsburgh	35	68	0	0	0	8	1	0	0	32	187
Reading	1	1	0	0	0	0	0	0	0	3	32
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	16	40	0	0	0	13	1	0	0	9	131
Cleveland	21	67	0	0	0	13	1	1	0	109	190
Columbus	9	16	0	0	0	6	0	0	0	11	73
Toledo	10	12	0	0	0	3	0	0	0	37	59
Indiana:											
Fort Wayne	2	0	0	0	0	0	1	0	0	1	22
Indianapolis	13	10	1	0	0	5	0	0	0	6	------
South Bend	3	0	0	0	0	1	1	0	0	0	18
Terre Haute	2	1	0	0	0	0	0	0	0	0	18
Illinois:											
Chicago	81	129	0	0	0	46	4	3	1	143	566
Peoria	------	4	------	0	0	0	------	0	0	11	20
Springfield	2	13	0	0	0	0	0	0	0	3	14
Michigan:											
Detroit	63	54	0	0	0	20	2	6	1	65	238
Flint	12	13	0	0	0	2	0	0	0	2	26
Grand Rapids	8	5	0	0	0	1	0	0	0	0	20
Wisconsin:											
Kenosha	2	2	1	0	0	0	1	0	0	0	7
Madison	3	0	0	0	------	------	0	1	------	2	------
Milwaukee	17	35	0	0	0	4	0	0	0	55	106
Racine	3	8	0	0	0	0	0	0	0	4	18
Superior	2	0	0	0	0	1	0	0	0	0	5
WEST NORTH CENTRAL											
Minnesota:											
Duluth	8	1	0	0	0	3	0	0	0	0	30
Minneapolis	35	13	0	0	0	1	1	0	1	12	71
St. Paul	15	3	0	0	0	1	1	0	1	0	51
Iowa:											
Davenport	1	0	0	0	------	------	0	0	------	0	------
Des Moines	7	8	0	0	------	------	0	0	------	0	19
Sioux City	3	5	0	5	------	------	0	0	------	3	------
Waterloo	2	0	0	0	------	------	0	3	1	9	------
Missouri:											
Kansas City	12	13	0	0	0	12	0	1	0	11	87
St. Joseph	3	0	0	0	0	1	0	1	0	0	26
St. Louis	33	19	1	0	0	11	4	5	0	42	216
North Dakota:											
Fargo	2	5	0	0	0	0	1	0	0	2	0
Grand Forks	2	0	0	0	------	------	0	0	------	0	------
South Dakota:											
Aberdeen	0	1	1	0	------	------	0	0	------	1	------
Nebraska:											
Omaha	5	3	1	1	0	3	0	1	0	2	54
Kansas:											
Topeka	4	2	0	0	0	2	0	0	0	1	21
Wichita	4	9	0	0	0	1	0	0	0	0	34
SOUTH ATLANTIC											
Delaware:											
Wilmington	1	1	0	0	0	0	0	0	0	5	28
Maryland:											
Baltimore	14	17	0	0	0	15	4	6	0	115	223
Cumberland	1	11	0	0	0	0	0	0	0	0	14
Frederick	0	0	0	0	0	0	0	0	0	0	3

City reports for week ended November 7, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
SOUTH ATLANTIC—continued											
District of Columbia:											
Washington	16	22	0	0	0	12	2	5	0	19	144
Virginia:											
Lynchburg	1	3	0	0	0	0	0	0	0	6	9
Norfolk	2	7	0	0	0	1	0	0	0	3	
Richmond	10	20	0	0	0	2	0	0	0	0	47
Roanoke	3	1	0	0	0	1	0	0	1	1	19
West Virginia:											
Charleston	2	3	0	0	0	0	0	[1] 3	0	6	
Wheeling	2	1	0	0	0	1	0	0	0	0	22
North Carolina:											
Raleigh	2	1	0	0	0	1	0	0	0	0	5
Wilmington	1	0	0	0	0	0	0	0	0	0	11
Winston-Salem	3	3	0	0	0	0	0	0	0	9	12
South Carolina:											
Charleston	1	1	0	0	0	2	1	0	0	0	25
Columbia	0	2	0	0	0	1	0	0	0	0	22
Greenville	1	0	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	7	8	0	0	0	3	1	1	0	1	68
Brunswick	0	0	0	0	0	0	0	0	0	0	2
Savannah	1	1	0	0	0	1	0	0	0	0	37
Florida:											
Miami	1	0	0	0	0	3	0	0	0	0	27
Tampa	0	1	0	0	0	1	0	0	0	0	15
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2		0				0				
Tennessee:											
Memphis	6	8	0	2	0	6	3	2	0	15	81
Nashville	3	0	0	0	0	2	2	0	0	2	42
Alabama:											
Birmingham	5	7	1	0	0	7	1	1	0	0	66
Mobile	1	0	0	0	0	1	0	0	0	0	23
Montgomery	2	2	0	0			0	0		0	
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	0	0	0			0	0		1	
Little Rock	2	3	0	0	0	1	0	1	0	1	1
Louisiana:											
New Orleans	6	9	0	1	0	12	2	4	2	1	165
Shreveport	1	1	0	0	0	3	0	0	0	4	38
Oklahoma:											
Tulsa	4	8	0	1			0	0		0	2
Texas:											
Dallas	7	14	0	0	0	4	1	2	1	5	71
Fort Worth	2	8	0	0	0	3	0	0	0	0	27
Galveston	0	0	0	0	0	2	0	1	0	0	14
Houston	3	1	0	0	0	1	0	0	0	0	63
San Antonio	1	0	0	0	0	8	0	1	1	0	54
MOUNTAIN											
Montana:											
Billings	1		0				0				
Great Falls	1	4	0	0	0	0	0	0	0	0	6
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	1	3	0	0	0	0	0	0	0	0	6
Idaho:											
Boise	1	0	1	0	0	0	0	0	0	0	11
Colorado:											
Denver	11	16	0	0	0	3	1	1	0	3	64
Pueblo	1		0				0				

[1] 2 cases nonresidents.

City reports for week ended November 7, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
MOUNTAIN—contd.											
New Mexico:											
Albuquerque	1	1	0	0	0	1	0	1	0	0	11
Arizona:											
Phoenix	0	0	0	0	0	6	0	0	0	0	-------
Utah:											
Salt Lake City	2	4	0	0	0	1	1	0	1	0	31
Nevada:											
Reno	0	1	0	0	0	0	0	0	0	0	8
PACIFIC											
Washington:											
Seattle	8	9	0	0	-------	-------	1	0	-------	1	-------
Spokane	6	-------	1	-------	-------	-------	0	-------	-------	-------	-------
Tacoma	3	1	2	0	0	1	0	0	0	0	30
Oregon:											
Portland	6	3	2	0	0	4	1	1	0	1	75
Salem	0	0	0	0	0	0	0	0	0	0	-------
California:											
Los Angeles	20	47	0	0	0	22	1	0	0	7	261
Sacramento	3	0	0	0	0	1	0	0	0	0	28
San Francisco	12	5	0	2	0	8	1	0	0	7	153

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Massachusetts:									
Boston	3	2	1	0	2	0	2	6	0
Worcester	1	0	0	0	0	0	0	1	0
Rhode Island:									
Providence	0	0	0	0	0	0	0	1	0
Connecticut:									
Hartford	0	0	0	0	0	0	0	1	1
MIDDLE ATLANTIC									
New York:									
New York	7	3	3	1	0	0	7	20	3
Rochester	0	0	0	0	0	0	0	1	0
New Jersey:									
Camden	0	0	0	0	0	0	0	1	0
Newark	0	0	0	0	0	0	0	6	1
Pennsylvania:									
Philadelphia	2	2	0	0	0	0	1	6	0
Pittsburgh	0	0	0	0	0	0	0	0	1
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	1	1	0
Toledo	0	0	0	0	0	0	0	1	0
Illinois:[1]									
Chicago	3	0	0	0	0	0	2	15	1
Peoria	0	0	0	0	0	0	-------	2	0
Michigan:									
Detroit	2	0	0	0	0	0	1	2	0
Flint	0	0	0	0	0	0	1	1	0
Grand Rapids	0	0	0	0	0	0	0	2	0
Wisconsin:									
Milwaukee	1	1	0	0	0	0	0	3	0

[1] Typhus fever, 3 cases: One case at Springfield, Ill., and 2 cases at Savannah, Ga.

City reports for week ended November 7, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	2	0
Minneapolis	1	0	0	0	0	0	0	8	0
St. Paul	0	0	0	1	0	0	0	8	0
Iowa:									
Davenport	0	0	0	0	0	0	0	0	1
Missouri:									
Kansas City	0	0	0	0	1	0	0	0	0
St. Joseph	0	0	0	0	0	0	0	[2] 1	0
St. Louis	3	1	0	0	0	0	1	2	0
North Dakota:									
Fargo	0	0	0	0	0	0	0	1	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	1	1	0	0	1	1	0
Virginia:									
Lynchburg	0	0	0	0	0	0	0	1	0
Richmond	0	0	0	0	0	1	0	0	0
West Virginia:									
Wheeling	1	0	0	0	0	0	0	0	0
North Carolina:									
Raleigh	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston [3]	0	0	0	0	0	2	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Georgia:									
Atlanta	1	1	0	0	1	0	0	0	0
Savannah [1]	0	1	0	0	1	1	0	0	0
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	5	1	0	1	1
Shreveport	0	0	0	0	0	1	0	0	0
Texas:									
Dallas	1	1	0	0	0	0	0	0	0
Fort Worth	0	0	0	0	0	2	0	0	0
Galveston	0	0	0	0	0	1	0	0	0
PACIFIC									
Washington:									
Seattle	1	0	0	0	0	0	1	0	0
California:									
Los Angeles	0	0	0	0	0	0	1	1	0
Sacramento	1	1	0	0	0	0	0	0	0
San Francisco	0	0	0	0	0	0	1	1	0

[1] Typhus fever, 3 cases: 1 case at Springfield, Ill., and 2 cases at Savannah, Ga.
[2] Nonresident.
[3] Dengue, 1 case at Charleston, S. C.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended November 7, 1931, compared with those for a like period ended November 8, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, October 4 to November 7, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930
98 cities	65	70	70	70	82	77	[2] 85	90	[3] 94	[4] 82
New England	72	58	46	70	87	106	63	92	84	85
Middle Atlantic	40	40	34	33	32	34	41	44	32	33
East North Central	53	99	61	91	74	105	82	130	97	109
West North Central	99	68	128	76	145	66	174	93	155	[4] 77
South Atlantic	132	116	170	100	223	106	146	116	182	86
East South Central	221	96	233	143	122	179	204	293	[5] 289	215
West South Central	74	59	101	118	142	80	162	101	203	199
Mountain	36	44	52	18	35	62	[2] 9	35	[6] 49	123
Pacific	47	81	47	87	76	101	92	67	[7] 104	93

MEASLES CASE RATES

98 cities	29	22	26	35	32	36	[2] 37	59	[3] 39	[4] 59
New England	137	34	70	48	180	75	115	138	161	128
Middle Atlantic	15	15	20	22	19	29	30	27	27	34
East North Central	13	11	13	14	18	16	18	18	18	16
West North Central	2	77	10	143	6	143	11	294	15	[4] 282
South Atlantic	6	12	14	8	10	14	12	20	12	48
East South Central	0	18	0	6	17	24	23	42	[5] 13	84
West South Central	27	0	10	3	24	3	17	0	27	0
Mountain	52	115	78	194	17	141	[2] 63	414	[6] 157	229
Pacific	106	20	96	57	69	18	125	24	[7] 109	24

SCARLET FEVER CASE RATES

98 cities	99	95	101	120	126	121	[2] 139	161	[3] 170	[4] 169
New England	144	116	137	162	195	157	142	213	202	225
Middle Atlantic	76	51	74	85	100	78	127	132	134	133
East North Central	112	135	139	177	140	171	161	218	239	231
West North Central	86	93	94	116	119	116	136	163	140	[4] 140
South Atlantic	142	126	124	126	156	162	158	166	190	158
East South Central	233	161	70	132	145	149	198	245	[5] 107	293
West South Central	61	35	41	73	57	70	47	66	95	91
Mountain	139	291	44	238	174	167	[2] 172	344	[6] 275	282
Pacific	67	75	110	51	141	89	133	47	[7] 127	95

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] Boise, Idaho, not included.
[3] Covington, Ky.; Billings, Mont.; Pueblo, Colo.; and Spokane, Wash.; not included.
[4] Waterloo, Iowa, not included.
[5] Covington, Ky., not included.
[6] Billings, Mont., and Pueblo, Colo., not included.
[7] Spokane, Wash., not included.

Summary of weekly reports from cities, October 4 to November 7, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930
98 cities	1	2	1	2	2	2	[2] 2	3	[3] 2	[4] 2
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	0	2	0	4	0	2	1	1	0	4
West North Central	2	6	6	0	10	0	6	19	11	[4] 6
South Atlantic	4	0	0	0	4	0	0	0	0	0
East South Central	0	0	6	0	0	0	0	0	[5] 13	0
West South Central	0	3	0	3	3	7	0	3	3	7
Mountain	0	0	9	26	0	0	[2] 0	9	[6] 0	9
Pacific	10	6	2	0	12	18	12	14	[7] 4	6

TYPHOID FEVER CASE RATES

	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930
98 cities	20	20	18	16	22	17	[2] 16	14	[3] 12	[4] 11
New England	19	22	10	10	29	29	5	5	10	5
Middle Atlantic	15	14	16	10	24	12	11	9	11	5
East North Central	5	9	8	7	12	5	16	7	6	9
West North Central	11	10	33	15	19	8	19	14	21	[4] 4
South Atlantic	53	70	40	62	26	40	38	32	30	32
East South Central	64	42	52	42	105	84	6	102	[5] 19	24
West South Central	78	49	41	21	37	24	17	14	30	28
Mountain	35	44	9	35	17	79	[2] 0	0	[6] 10	18
Pacific	10	16	4	22	6	16	25	18	[7] 0	16

INFLUENZA DEATH RATES

	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930
91 cities	3	5	5	5	4	5	[2] 5	9	[8] 7	9
New England	2	5	2	7	2	2	10	2	12	2
Middle Atlantic	4	6	6	4	2	6	4	9	8	12
East North Central	2	3	2	4	3	3	6	6	5	6
West North Central	0	6	0	3	3	9	0	9	6	3
South Atlantic	0	2	0	6	10	4	4	18	4	10
East South Central	6	0	6	0	13	6	6	13	[5] 0	26
West South Central	7	11	14	7	17	7	0	21	17	14
Mountain	17	9	35	9	9	9	[2] 18	18	[6] 20	9
Pacific	5	0	5	7	7	7	2	2	5	7

PNEUMONIA DEATH RATES

	Oct. 10, 1931	Oct. 11, 1930	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930
91 cities	55	71	64	72	69	86	[2] 82	90	[8] 87	101
New England	77	70	75	87	50	99	90	104	67	89
Middle Atlantic	56	74	63	70	78	102	96	109	107	116
East North Central	35	55	45	50	52	52	63	87	64	74
West North Central	56	87	100	54	91	60	75	96	80	87
South Atlantic	79	86	87	96	67	136	113	134	117	152
East South Central	69	123	69	102	95	84	101	65	[5] 123	136
West South Central	76	110	59	82	97	125	86	103	66	110
Mountain	35	97	87	194	78	79	[2] 54	167	[6] 128	104
Pacific	55	40	65	65	55	60	46	32	53	42

[2] Boise, Idaho, not included.
[3] Covington, Ky.; Billings, Mont.; Pueblo, Colo.; and Spokane, Wash., not included.
[4] Waterloo, Iowa, not included
[5] Covington, Ky., not included.
[6] Billings, Mont., and Pueblo, Colo, not included.
[7] Spokane, Wash., not included.
[8] Covington, Ky.; Billings, Mont.; and Pueblo, Colo., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended October 31, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended October 31, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		2	2		
New Brunswick					4
Quebec Province			39		31
Ontario	4	1	1	7	13
Manitoba					3
Saskatchewan	1			3	3
Alberta				2	1
British Columbia					1
Total	5	3	42	12	56

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended October 31, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended October 31, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	49	Poliomyelitis	39
Diphtheria	59	Puerperal fever	3
Erysipelas	5	Scarlet fever	81
German measles	2	Tuberculosis	54
Measles	69	Typhoid fever	31
Mumps	7	Whooping cough	22

LATVIA

Communicable diseases—September, 1931.—During the month of September, 1931, cases of certain communicable diseases were reported in Latvia as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	3	Mumps	51
Diphtheria	53	Poliomyelitis	5
Dysentery	7	Puerperal fever	9
Erysipelas	27	Scarlet fever	46
Influenza	64	Tetanus	2
Leprosy	1	Trachoma	52
Lethargic encephalitis	1	Typhoid fever	141
Measles	6	Whooping cough	47

MEXICO

Tampico—Communicable diseases—October, 1931.—During the month of October, 1931, certain communicable diseases were reported in Tampico, Mexico, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Enteritis, various		37	Tuberculosis	89	23
Influenza	5	1	Typhoid fever	4	2
Malaria	321	23	Whooping cough	4	1
Paratyphoid fever	1				

PORTO RICO

San Juan—Communicable diseases—Four weeks ended November 7, 1931.—During the four weeks ended November 7, 1931, cases of certain communicable diseases were reported in San Juan, P. R., as follows:

Disease	Cases	Disease	Cases
Diphtheria	7	Measles	38
Filariasis	6	Mumps	2
Influenza	6	Pellagra	2
Malaria	96	Whooping cough	33

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of *Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.*

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14
Ceylon: Colombo	C	1	1		3												
	D	1	1		3												
China:																	
Canton	C	2	1			1	1										
	D	1															
Shanghai	C			1	7	1	58	30	36	35	29	17	17	8			
	D						3	4	2	5	8			4			
Swatow	C		10	7													
Tientsin	C	1	10														
	D	1	1														
India	C	13,604	18,001	22,074	36,514	10,734	9,834	9,740	8,915								
	D	7,270	10,337	12,093	20,276	6,044	5,518	5,321	4,800								
Bombay	C			23	44	27	5	5	5	1	1	2					
	D			16	25	9	5	2	1		1	2					
Calcutta	C	265	292	237	110	10	3	15	18	18	23	3	7				
	D	149	168	155	30	4	2	3	6	6	12		5				
Chittagong	C												1				
Karikal	C	12			1	1			1	1							
	D	7			1	1			1								
Madras	C	52	9	4	6	3	1	1									
	D	17	4														
Moulmein	C			1													
	D			1													
Negapatam	C					1											
Rangoon	C	2	4	4	1					1				1			
	D	1	2	1	1					1				1			
Vizagapatam	C		1														
India (French):																	
Chandernagor	C	4	3	5	7		1	1		1							
	D	4	3	1	7		1	1		1							
Pondicherry	C	17	3	3	3	2			2		1						
	D	7	3	3	2	1			1								

India (Portuguese)	C		1	2	2	1	2	25	6								
	D			1	2	1	1	10	6								
Indo-China (see also table below):																	
Cochin-China—Rachgia	C				P												
Pnompenh	C		1	5	2			1	1		1						
	D	2	1	2	1			1	1		1						
Saigon and Cholon	C	104	61	14								1					
	D	76	41	7								1					
Iraq:																	
Abulkhasib	C					6											
	D					5											
Amara	C				2	22	35	8	1			2	2	2			3
	D				1	21	30	7	1				1	1			2
Amara Province	C					6	11	106	73	32	21	15	27	13	7	15	
	D					5	4	67	44	29	24	14	17	10	6	8	
Basra	C				547	148		54	91	77	19	29	32	38	30	9	1
	D				287	76		30	48	34	11	13	26	7	18	10	1
Basra Province	C				5	14	6	10	23	26	14	1	1	3	7		
	D				2	10	3	7	10	9	8	1	1	1	4		
Diwaniyah	C									1							
Diwaniyah Province	C									15	8	14	24	22	1		
	D									11	6	5	22	10	5		
Iwaniyah	C									22							
	D									15							
Muntafiq Province	C					10	21	66	128	55	54	45	55	17	19	9	23
	D					8	20	42	75	38	57	28	37	10	18	6	17
Nasiriyah	C						22	50	16	4	4	18	7	4	7	6	7
	D						15	40	20	3	4	18	3	3	6	3	6
Suqelshuyukh	C					2											
	D					2											
Japan: Taiwan—Kelung	C															2	
Persia:[1] Rafsanjan[2]	C	36															
	D	14															
Philippine Islands:[3] Provinces—																	
Capiz	C	17	4				9	9	17	49	21	5	4		7	5	
	D	15	4				5	6	5	35	16	5	3		5	4	
Cebu	C				3												
	D				3												
Iloilo	C		26	27													
	D		21	25													
Negros, Occidental	C		2														
	D		1														
Pampanga	C	1															
Siam	C	14	4	3	1	1											
	D	5	2	1		1											
Bangkok	C	3	1	4	1	1											
	D	1	1	2													

[1] On Oct. 23, 1931, cholera was reported at Mohammerah, Abadan, and Ahwaz, Persia. During the period from Oct. 22 to Nov. 7, 1931, 141 cases and 97 deaths were reported. The diagnosis of cholera was not confirmed upon bacteriological examination.

[2] From May 3 to 25 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.

[3] Figures for cholera in the Philippines Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	September, 1931 12	September, 1931 19	September, 1931 26	October, 1931 3	October, 1931 10	October, 1931 17	October, 1931 24	October, 1931 31	November, 1931 7	November, 1931 14
On vessel:																	
S. S. Arankola, at Rangoon, from Calcutta	C	1															
S. S. City of Eastborne, at Calcutta from Cocanada	C		1														
S. S. Tairea, at Penang, from Calcutta	C		1														
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C			1													
	D			1													
S. S. Kohistan, at Basra, from Bushire, Persia	C			2													
S. S. Cathay, at Kobe, Japan, from Shanghai	C				4												
	D				1												
S. S. Kasagi Maru, at Moji, from Shanghai	C						1										
S. S. Ankoo, at Nagasaki, from Shanghai	C							2									
	D							1									

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931 1-10	July, 1931 11-20	July, 1931 21-31	August, 1931 1-10	August, 1931 11-20	August, 1931 21-31	September, 1931 1-10	September, 1931 11-20	September, 1931 21-30	October, 1931 1-10	October, 1931 11-20
Indo-China (French) (see also table above):																
Cambodia [1]	C	100	113	117	308	72	82	87	12				8	6	1	16
	D	29	70	63	109			60	2				4	3	1	16
Cochin-China [1]	C	105	107	174	140	66	30	47	39				9	9	11	10
	D	73	74	133	106			42	32				6	7	2	2

[1] Reports incomplete.

PLAGUE

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Aug. 29, 1931	Week ended— September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14
Algeria:																	
Algiers	C				2												
Bone	C		1														
Philippeville	C			1	2												
	D			1	1												
Argentina: San Juan Province	C			P													
Belgian Congo	C		1														
	D		1														
British East Africa (see also table below):																	
Tanganyika	C	46	17	6	8				4	8	2						
	D	30	10	6	2				4	4							
Uganda	C	138	298	418	285	59	59	107	84	83	62						
	D	126	286	400	281	61	56	107	83	82	63						
Ceylon: Colombo	C	3	2	1	6		1	1	1	1	1	2					
	D	3	2	1	6		1	1	1	1	1	1					
Plague-infected rats		5			8												
China:[1]																	
Amoy	C	1															
	D	1															
Shansi Province[2]	C														P		
Shensi Province	C														P		
Dutch East Indies:																	
Batavia and West Java	C	59	116	75	58	19	18	8	20	21	31					1	
	D	59	66	75	58	19	18	8	20	21	31						
East Java and Madura	C	1															
	D	1															
Java and Madura	D	176	192	212	205	58	68	51	56	77	69	85					
Egypt:																	
Alexandria	C		4	13	9	2	2		1	1				1	1	3	1
	D		4	5	3	1	1									1	1
Assiout	C	18	11														
	D	7	1														

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April. On September 19, 1931, 18 deaths were reported in Changchuanpu and new cases in Kaitung and Fengtien.

[2] On October 17, 1931, plague epidemic was reported in western Shansi Province, China, with 2,000 deaths at Hsinghsien.

80805°—31——4

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14
Egypt—Continued																	
Beni-Suef	C	5															
	D	3															
Beheira	C				3		2										
Dakahlia	C			1	2												
Deirout	C	10	3														
	D	4	1														
Gharbieh	C		1														
	D		1														
Girga	C	7		1													
	D	2															
Kena	C	1															
	D	1															
Minieh	C	6	3	12												1	3
	D	3	1	4												1	1
Port Said	C		3	5	2									1			
	D	1	2	1													
Tanta	C				2		1		1								
France: Rouen-Devilleles	C														P		
Hawaii Territory:																	
Hawaii—Hamakua—Plague-infected rats		1			1												
Maui Island—																	
Haliimaile—Plague-infected rats									1								
Kula District	C				1												
	D				1												
Makawao—Plague-infected rats									1								
Paia—Plague-infected rats										1							
Paauilo—Plague-infected rats														1			
India	C	752	88	221	684	282	337	554	659								
	D	692	51	128	410	146	179	238	209								
Bassein	C	1		4	2		1	2	1	1				1			
	D	1		3	2		1	2	1	1				1			

Bombay	C	8		12								1		1			
	D	6		6								1					
Plague-infected rats		94	37	48	47	23	17	7	10	9	9	12	12	4			
Burma	C			16													
	D			10													
Madras Presidency	C	2	6	21		9	75	88	114			3	90				
	D	1	1	9		4	51	52	55			1	59				
Moulmein	C			9		P	5										
	D			1			4	3	2	2							
Rangoon	C	2	1	2	1	2	1							5			
	D	2	1	1	1	1	1							1			
Plague-infected rats		7	3	6	3	1	1	1	1	1	1	1	1	1			
Indo-China (see also table below): Pnompenh	C		3														
	D		2														
Iraq:																	
Baghdad	C	23	23	3	1		2	1							1		
	D	9	9	2			1										
Maudhan	C	3														2	1
	D															1	
Madagascar (see also table below): Tamatave	C				1			2		1							
Morocco	C									10			8	2	2		
	D												8		4		
Peru (see table below).																	
Senegal (see table below).																	
Siam	C	2	1		1	1	1				1	1					
	D	2	1			1	1				1						
Spain: Hospitalet—Barcelona Province	C				5	1			1	1	1			5		1	
	D				2				1		1			1			
Syria: Beirut	C			2	1			1	1	1	2					1	
Tunisia: Tunis	C	16	11					1				1					
	D	3	1														
Union of South Africa:																	
Cape Province—Plague-infected rats					•1												
Orange Free State	C	2															
	D	2															

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931
British East Africa (see also table above):							
Kenya	C	215	154	484	235	14	19
Indo-China (see also table above)	C		2	1		1	3
	D		2	1		1	1
Madagascar (see also table above):							
Ambositra Province	C	19	15	1	2		
	D	18	15	1	1		
Antsirabe Province	C	7	12	13	22		
	D	7	12	12	22		
Miarinarivo Province	C	2		8	20		
	D	2		7	19		
Moramanga Province	C	2	1	1	3		
	D	2			3		
Tananarive Province	C	18	10	5	45		
	D	18	9	5	44		
Peru	C	2	5	3	19		
	D		1	2	14		

Place		May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931
Senegal:							
Baol [1]	C	4		27	101	13	6
	D	3		13	58	8	2
Dakar [1]	C	63	61	95	194	45	4
	D	49	56	73	106	31	4
Diourbel [1]	C					9	
	D					3	
Louga [1]	C	5	4	3	2	10	1
	D	2	2	1	1	4	2
Rufisque [1]	C	1	2	34	2	1	7
	D						1
Thies [1]	C		12	16	26	12	7
	D		3	7	16	8	5
Tivaouane [1]	C	19	3	3			
	D	11	2	2			

[1] Reports incomplete.

SMALLPOX

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	
Algeria:																			
Algiers	C	1	8	1															
Constantine	C	1		1						1									
Belgian Congo	C	47	42																
Bolivia.[1]																			
Brazil: Porto Alegre (alastrim)	C	19	5	41	11	6	17		7	13	12	16	12	18					
	D			1	1				2		2			2					
British East Africa: Tanganyika	C	13	7	149	1	18			31	4	6	9			1,121				
	D			17							1	4			91				
British South Africa:																			
Northern Rhodesia	C			21			26												
Southern Rhodesia	C		1	2						1									
Canada:																			
Alberta	C			1		1							12				1	2	2
British Columbia	C			2	2			3		1	1								1
Manitoba	C		4									1							
Winnipeg	C										1								
Ontario	C	17	32	35	1		2	2	4		2		5	2	1	9		7	3
Kingston	C									1									
Ottawa	C		1								1		5	2		1		4	3
Sault Ste. Marie	C	1																	
Toronto	C	1	1																
Quebec	C			1															
Saskatchewan	C	48	54	42		10	6	10	8	8	12	5	1	6	3	1	11	3	1
Regina	C	2											1			1			
Chile:																			
Antofagasta	C			1															
Chanaral	C	1																	
China:																			
Amoy	C	6	4	2	1						1		1			1			
	D	3	3	2	1						1		1						
Canton	C	3	1	2					1										
Foochow	C	P	P	P		P		P		P		P		P					
Hankow	C	5	4	3	1		1	1					1						
Hong Kong	C	1																	
	D	2																	

[1] An epidemic of smallpox was reported on May 18 with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	Nov.
China—Continued.																			
Manchuria—																			
Harbin (see also table below)	C	3																	
Kwantung—Dairen	C	2	1																
Nanking	C	P				1													
Shanghai—																			
Foreigners only	C	7	11	3									35	29	17	17	1	6	
Including natives	D	7	13	6				1	1			1	5	8					
Tientsin	C	2		3															
Chosen (see table below).																			
Colombia:																			
Cali	D	1																	
Santa Marta	D										1								
Dutch East Indies:																			
Batvia and West Java	C	2																	
East Java and Madura	C	1																	
Eritrea	C	3		2					10										
	D								2										
France (see table below).																			
Great Britain:																			
England and Wales	C	570	287	187	26	25	19	21	33		19	45	45	41	34	41	39	42	
Bradford	C	8	5																
Leeds	C	2																	
London	C	183	122	54	6	12	4	4	3	9	5	15	5	17	15	21	20	27	
London and Great Towns	C	403	228	152	22	20	17	10	13	30	11	34	35	31	25	37	31	37	
	D		1	1															
Sheffield	C										1	1							
Greece (see table below).																			
Honduras: Puerto Castilla	C													1					
India	C	11,403	7,313	5,359	978	904	645	400	483	484	409	329							
	D	1,849	1,704	1,352	234	213	179	120	144	108	109	72							
Bassein	C	1																	
Bombay	C	9	6	6	1		1			1	2	2							
	D	4	5	6	1					1									

Calcutta	C	89	47	21	4	4		5	2	1	2		1				1		
	D	75	41	18		4		5	2	1	2		1				1		
Cochin	C	3				1	1	1					1	1	2	4	3		
Karachi	C		2		1												1		
	D		1																
Madras	C	8	2	2	1					1			1	5	6	1	2		
	D	6	1												2				
Negapatam	C		3	1		2			3		1			1		1			
Rangoon	C	13	6	3	2		1	1	1		1			2		1			
	D	5	2	1	1			1			1			1	1				
Vizagapatam	C	6	6	5		3		2	3	1	1	1	2	4			1		
	D	1	2	1		3		1	3	1	1	1		1			1		
India (French):																			
Chandernagor	C	7	1	3															
	D	5		2															
Karikal	C	4	6	4	1	1	3	2		2	5			5		1			
	D	4	6	4	1	1	2	2		2	1			1		1			
Pondicherry Province	C	11	7	28	11	6		3	1	6	1	18	1	4	14	4			
	D	11	7	28	11	6		3	1	6	1	16	1	4	12	4			
India (Portuguese)	C	3																	
	D	1																	
Indo-China (see also table below):																			
Pnompenh	C	1	2																
	D	1																	
Saigon and Cholon	C	2		3	1	1			1		3	2	1	4	1			4	
	D	1		1	1				1		2		1	2				4	
Iraq:																			
Baghdad	C	3	1								1								
	D	2																	
Basra	C	2	1																
Mosul Liwa	C			1				1					5						
Ivory Coast (see table below).																			
Japan: Nagoya	C			1															
Mexico (see also table below).																			
Jalisco (State)—Guadalajara	D	2	1	3			2						1	1	2				2
Mexico City and surrounding territory	C	45	25	22	8	2			2	2	1		2	1	2	2			
	D	11	13	8	1	1					1	1	1	2		1			
Monterrey	C		1															2	
Torreon	C	1	3							1	1			1					
	D		2								1								
Vera Cruz	C	1																	
Morocco (see table below).																			
Netherlands: Friesland—Opsterland	C																[1]1		
Poland	C	3	3	18								1						1	
Portugal: Lisbon	C	67	48	45	17	12	8		10	21	18	17	16	11	6	15	19		
Rumania (see table below).																			
Siam	C	6	5	1							3								
	D	1	1	1															
Spain	C			7															
Straits Settlements	C	2				1											15		
	D	2															1		

[1] Imported case.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	Nov. 7, 1931
Sudan (Anglo-Egyptian)	C	6	1								32								
	D	2									6								
Syria (see table below).																			
Turkey (see table below).																			
Union of Socialist Soviet Republics (see table below).																			
Union of South Africa:																			
Cape Province	C	P																	
Natal	C							P			P								
Orange Free State	C	P	P	P			P	P	P	P			P						
Transvaal	C		P	P															
Upper Volta	C	88	12	2															
	D	1																	
On vessel:																			
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C							1											
S. S. Talodi at Suakin	C	1																	

Place		April, 1931	May, 1931	June, 1931: 1-10	11-20	21-30	July, 1931: 1-10	11-20	21-31	August, 1931: 1-10	11-20	21-31	September, 1931: 1-10	11-20	21-30	October, 1931: 1-10	11-20
Indo-China (see also table above)	C	142	53	30	16	1	1		7	29				7	27	10	11
	D						1		4	11				4	8	3	3
Ivory Coast	C											7					
	D											4					
Syria: Beirut	C				1												

Place		February, 1931	March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931
China: Harbin (see also table above)	C		7		13	10		
Chosen	C		11		1	4	2	
	D		3				1	
France	C	16	15	6	54	9	20	
Greece	C	4			3	1		
Mexico (see also table above)	D	3		1	1	2		
Morocco	C	4	6	7	49	48	23	23
Rumania	C		1		1			1
Turkey	C	37	1		9	1		
	D	6						
Union of Socialist Soviet Republics	C		1,903	1,516	1,345			
Territories in Asia	C	532						
Ukraine	C	23						
Other territories in Europe	C	1,577						
Railroads, etc	C	77						

TYPHUS FEVER

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	Nov. 7, 1931
Algeria:																			
Algiers	C	7	9	2												1		1	
Bone	C						1	1											
Constantine Department	C	22	26	3	1							2		1				11	
Oran	C	2	2			1				1									
Australia, Western	C	1																	
Bulgaria	C	16	30						1								1		
	D	4	6																
China:																			
Manchuria—Harbin	C		10						1										
Shanghai	C			3			1						1						
Chosen (see table below).																			
Colombia: Cali	D									1									
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C		3								1	1							
Cairo	C								1										
Gharbeh	C																		1
	D																		1
Great Britain: Scotland—Fife County	C	1																	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	Nov. 7, 1931
Greece (see table below).																			
Guatemala (see table below).																			
Iraq: Baghdad	C	2																	
	D	2																	
Irish Free State:																			
Cork County—																			
Schull	C			1															
Skibbereen	C		2	1															
Kerry County—																			
Dingle	C	1																	
Listowel	C		1																
Kildare County—Naas	C												1						
Limerick County—																			
Croom	C													1					
Glin	C										2			1					
Limerick	C			2	1														
Michelstown	C			1															
Rathkeale	C													1					
Mayo County—																			
Belmullet	C	1																	
Castlebar	C							1											
Westport	C							1											
Japan	C		1																
Lithuania (see table below).																			
Mexico (see also table below):																			
Durango	D			1															
Mexico City, including municipalities in Federal District	C	75	46	53	7	6		5	5	1	2	2	4	2	5	3			
	D	33	19	12	5	3		2	1	1		2	2	2	2	2			
San Luis Potosi	D	2		4				1											
Torreon	C			1											1	1		3	
	D			1											1	1		5	1
Morocco	C	42	101	102		2	1	5						1		3		1	
	D	4	6	8															

Palestine	C	4	5	2	3	3	1	4				4	4	1	1		2		1
Panama Canal Zône—Balboa	C	2																	
Poland	C	298	97	53	10	4	10	7	6	2	1	2	2	8	3	1	2	6	
	D	18	4	5	1		1							1				1	
Rumania	C	169	80	11	7	9	4	3		4	6	3	1	6					
	D	18	13	5		1		1				1							
Syria	C	4																	
Tunisia: Tunis	C	29	73	2					1		1	1							
	D	3	4																
Turkey (see table below).																			
Union of Socialist Soviet Republics (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P		P	P	P	P	P	P	P	P	P					
Municipality of East London	C		1		1														
Natal	C	P	P	P		P					1								
Orange Free State	C	P	P	12															
Transvaal	C	P	P	P		P	P	P	P	P	P	P	P	P					
Yugoslavia (see table below).																			

Place		March, 1921	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Chosen: Seoul	C	3	4		6	1		
	D		1		1	1		
Czechoslovakia	C		5	11	2			
Greece	C	8	22	6	9	2	13	5
	D	1	3				2	
Guatemala	C				33	31	3	
	D				15	5		
Lithuania	C	99	31	10	13	8	2	
	D	3	5		2			

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Mexico (see also table above)	D	238						
Turkey	C	15	32	13	11	9		
Union of Socialist Soviet Republics	C	2,206	1,513	1,324				
Yugoslavia	C	10	43	14	2	3	1	
	D	1	5					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	12	19	26	October, 1931 3	10	17	24	31	November, 1931 7	14
Brazil:																	
Alagoas State	C				1												
	D				1												
Maceio	D															1	
Ceara State	C	1	1		1												
	D	1			1												
Minas Geraes State	C	2															
	D	1															
Rio de Janeiro State	C	2															
Sergipe State	C		1														
British Cameroons: Mamfe	C	3	2														
	D	2															
Colombia: Magdalena Province—Near Cienaga	C			4													
Gold Coast:																	
Akuse	C			2													
	D			1													
Dagomba District	C				4												
Kete Krachi	C												1				
Kintampo	C			1													
	D			1													
Oda	C								1								
	D								1								
Tamale	C			2						2				1			
	D			2						2							
Wale Wale	C				1												
	D				1												
Ivory Coast:																	
Bobo Dioulasso	C			1													
	D			1													
Grand Bassam	C				4			1									
	D				2			1									
Kong Circle	C			4													
Seguela	C				P												
Tehini	C															1	

Nigeria	C				1										1		
	D				1												
Senegal:																	
Podor (Hinterland)	C				1												
	D				1												
St. Louis	C									1							
Thies	C									1							
	D									1							
Sudan (French)	C			4													
Macina—Kayo Circle	C																2
Togo (French): Atakpame—Anie Circle	C															1	
Upper Volta:																	
Banfora	C			2						2							
	D			1						1							
Dedougou	C														2		
Diarabakoko	C									2							
	D									1							
Ouagadougou	C				1					1			1				

UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

ISSUED WEEKLY

BY THE UNITED STATES
PUBLIC HEALTH SERVICE

VOLUME 46 :: :: NUMBER 49

DECEMBER 4 - - 1931

SPECIAL ARTICLES

Directories of State and City Health Officers, 1931

UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1931

UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

The PUBLIC HEALTH REPORTS are issued weekly by the United States Public Health Service through its Division of Sanitary Reports and Statistics, pursuant to acts of Congress approved February 15, 1893, and August 14, 1912.

They contain: (1) Current information of the prevalence and geographic distribution of preventable diseases in the United States in so far as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other communicable diseases throughout the world. (2) Articles relating to the cause, prevention, or control of disease. (3) Other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS are intended primarily for distribution to health officers, members of boards or departments of health, and those directly or indirectly engaged in or connected with public health or sanitary work. Articles of general or special interest are issued as reprints from the PUBLIC HEALTH REPORTS or as supplements, and in these forms are available for general distribution to those desiring them.

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PUBLIC HEALTH REPORTS

VOL. 46 DECEMBER 4, 1931 NO. 49

STATE AND INSULAR HEALTH AUTHORITIES, 1931

DIRECTORY, WITH DATA AS TO APPROPRIATIONS AND PUBLICATIONS

Directories of the State and insular health authorities of the United States for each year from 1912 to 1930 have been published in the Public Health Reports [1] for the information of health officers and others interested in public-health activities. The present volume (1931), like those formerly issued, has been compiled from information furnished by the respective State and insular health officers, and includes data as to appropriations and publications.

Where an officer has been reported to be a "whole-time" health officer, that fact is indicated by an asterisk (*). For this purpose a "whole-time" health officer is defined as "one who does not engage in the practice of medicine or in any other business, but devotes all of his time to official duties."

ALABAMA

Board of censors of the medical association of the State of Alabama, acting as a committee of public health:
- B. M. Miller, governor, ex officio chairman. Montgomery.
- W. D. Partlow, M. D., chairman. Tuscaloosa.
- R. S. Hill, M. D., Montgomery.
- Fred W. Wilkerson, M. D., Montgomery.
- D. T. McCall, M. D., Mobile.
- W. W. Harper, M. D., Selma.
- J. S. McLester, M. D., Birmingham
- M. Y. Dabney, M. D., Birmingham.
- A. L. Harlan, M. D., Alexander City.
- S. A. Gordon, M. D., Marion.
- J. M. Watkins, M. D., Troy.

Executive health officer:
- *J. N. Baker, M. D., State Health Officer, Montgomery.

Administrative assistant:
- *D. L. Cannon, M. D., Montgomery.

Secretary to State health officer.
- *Bessie Tucker, Montgomery.

Financial secretary:
- *Adna Eley Alldredge, Montgomery.

Registrar of vital statistics:
- *W. T. Fales, Montgomery.
- *Ethel Hawley, chief clerk, Montgomery.

Laboratories of the State Board of Health:
- General director—
  - *L. C. Havens, M. D., Montgomery.
- Assistant director—
  - *Catherine R. Mayfield, Montgomery.
- Anniston branch—
  - *Katie Mae Wilson Field, Anniston.
- Birmingham branch—
  - *George A. Denison, M. D., Birmingham.
- Mobile branch—
  - *C. H. Waite, Mobile.
- Tennessee Valley—
  - *A. J. Perolio, M. D., Decatur.
- Tuscaloosa branch—
  - *Lucile Watt, Tuscaloosa.
- Selma branch—
  - *Cooper Brougher, Selma.
- Dothan branch—
  - *Nellie K. Whitfield, Dothan.
- Huntsville branch—
  - *Agnes Chandler, Huntsville.

[1] Reprints Nos. 83, 123, 190, 286, 344, 405, 488, 544, 605, 706, 775, 871, 949, 1043, 1106, 1188, 1254, 1334, and 1425, from the Public Health Reports.

State sanitary engineer:
- *G. H. Hazlehurst, C. E., M. C. E., Montgomery.

Assistant sanitary engineers:
- *H. G. Menke, B. C. E., Montgomery.
- *C. C. Kiker, B. C. E., Montgomery.
- *T. H. Milford, B. C. E., Montgomery.

Communicable disease control:
- *D. G. Gill, M. D., D. P. H., director, Montgomery.
- *W. E. Wilson, M. D., C. P. H., assistant director, Montgomery.
- *S. B. McPheeters, M. D., chest clinician, Montgomery.
- *T. D. Rivers, M. D., chest clinician, Montgomery.
- *P. W. Auston, M. D., chest clinician, Montgomery.
- *C. B. Webster, D. D. S., dentist, Montgomery.
- *M. L. Rutland, D. D. S., dentist, Montgomery.

County organization:
- Divisional director—
  - *B. F. Austin, M. D., Montgomery.

Director field training station:
- *A. H. Graham, M. D., D. P. H., Opelika.

Public health nursing:
- *Jessie L. Marriner, R. N., director, Montgomery.
- *Frances C. Montgomery, R. N., assistant director, Montgomery.
- *Annie Jewel Brown, R. N., assistant director, Montgomery.
- *Margaret Murphy, R. N., assistant director, Montgomery.
- *Catherine Corley, R. N., assistant director, Montgomery.

Inspection:
- *C. A. Abele, Ch. E., director, Montgomery.
- *H. J. Thrasher, assistant director, Huntsville.
- *U. D. Franklin, dairy inspector, Huntsville.
- *F. H. Downs, dairy inspector, Montgomery.
- *J. W. Garrett, dairy inspector, Selma.
- *H. W. Caldwell, D. V. M., dairy inspector, Montgomery.
- *D. Cook, D. V. M., dairy inspector, Montgomery.
- *C. G. Allen, dairy inspector, Montgomery.
- *C. H. South, district inspector, oyster control, Mobile.
- *B. F. Crane, district inspector, Birmingham.
- *B. S. Coon, district inspector, Montgomery.

Appropriation for fiscal year ending September 30, 1931:

Central administration	$539,383
County health work, per county	2,500
Inspection of dairy plants	12,000

ALASKA

Board of health:
- Harry C. De Vighne, M. D., commissioner of health, Juneau.

Executive health officer:
- Harry C. De Vighne, M. D., Commissioner of health, Juneau.

Assistant commissioners of health:
- F. J. O'Hara, M. D., Nome.
- J. A. Sutherland, M. D., Fairbanks.

Appropriation for 1931-32, $19,200.

ARIZONA

State board of health:
- George W. P. Hunt, governor, president, Phoenix.
- K. Berry Peterson, attorney general, vice president, Phoenix.
- Charles W. Sult, M. D., secretary, Phoenix.

Executive health officer:
- Charles W. Sult, M. D., State superintendent of health, Phoenix.

Executive secretary:
- *Gertrude Bryan Leeper, Phoenix.

State registrar of vital statistics:
- Charles W. Sult, M. D., Phoenix.

Statistician:
- *Mary Ellen Young, Phoenix.

State Laboratory:
- *Jane H. Rider, director, Tucson.
- *Marion E. Stroud, bacteriologist, Tucson.

Appropriations for the years July 1, 1931, to June 30, 1933:

	First year	Second year
State board of health—		
Salaries	$12,800	$12,800
Operation	3,475	3,650
Travel	1,650	1,650
Capital	200	200
Total	18,125	18,300
State laboratory—		
Salaries	8,940	8,940
Operation	1,300	1,350
Travel	900	900
Capital investment	1,000	500
Total	12,140	11,690

ARKANSAS

Board of health:
- W. P. Parks, M. D., president, Hot Springs.
- R. M. Eubanks, M. D., Little Rock.
- E. L. Watson, M. D., Newport.
- O. L. Williamson, M. D., Marianna.
- A. S. Gregg, M. D., Fayetteville.
- L. F. Duncan, M. D., Waldron.
- F. O. Mahony, M. D., El Dorado.

Executive health officer:
- *C. W. Garrison, M. D., State health officer, Little Rock.

Bureau of vital statistics:
- *Mrs. Mary Ellis Brown, statistician, Little Rock.

Hygienic laboratory:
- *H. V. Stewart, associate director, Little Rock.

Bureau of sanitation and malaria control:
- *M. Z. Bair, chief sanitary engineer, Little Rock.

Bureau of child hygiene:
- *C. W Garrison, M. D., director, Little Rock.

County health units:
*Gordon Hastings, M. D., director, Little Rock.
Appropriations for biennial period ending June 30, 1933:

Executive department, salaries and miscellaneous	$32,000
Bureau of vital statistics	40,800
Payment of local registrars	31,000
Malaria control	9,760
Bureau of sanitation	10,600
Bureau of child hygiene	4,000
Hygienic laboratory	25,440
County Health units (to be derived from premiums on life-insurance policies)	170,000

CALIFORNIA

Board of public health:
George E. Ebright, M. D., president, San Francisco.
Fred F. Gundrum, M. D., vice president, Sacramento.
Giles S. Porter, M. D., director of public health, Sacramento.
A. J. Scott, jr., M. D., Los Angeles.
Edward F. Glaser, M. D., San Francisco.
Robert A. Peers, M. D., Colfax.
Department of public health:
*Giles S. Porter, M. D., director of public hea'th, Sacramento.
District health officer:
*Gavin Telfer, M. D., southern division.
Chief sanitary inspector:
*Edward T. Ross, Sacramento.
Chief cannery inspector:
*Milton P. Duffy, San Francisco.
Vital statistics:
*Mrs. Marie B. Stringer, registrar, Sacramento.
Bureau of registration nurses:
*Sarah G. White, R. N., chief, Sacramento.
Bureau of tuberculosis:
*Edythe L. M. Tate-Thompson, chief, Sacramento.
Bureau of food and drugs:
*C. H. McCharles, chief, Berkeley.
Bacteriological laboratory:
*W. H. Kellogg, M. D., chief, Berkeley.
Bureau of sanitary engineering:
*C. G. Gillespie, C. E., chief, Berkeley.
Bureau of child hygiene:
*Ellen S. Stadtmuller, M. D., chief, San Francisco.
Malaria control:
*Edward Stuart, C. E., in charge.
Appropriations, available July 1, 1931, for biennial period ending June 30, 1933 (eighty-third and eighty-fourth fiscal years):

Administration—	
For support, department of public health	$639,010
Aid to mosquito abatement districts	10,000
Division of cannery inspection—	
For support	247,030
(Payable from cannery inspection funds.)	
Nurses' registration bureau—	
For support	$40,900
Tuberculosis bureau—	
Allotment for support, $47,900 included in item "for support, department of public health."	
For subsidies	740,000
Orthopedics survey for aid to physically defective children	10,000
Total	1,686,940

Other sources of revenue:
Fees for registration of nurses, $10 each.
(Fees for California graduate nurses, $5 only.)
Renewal of registration certificates, $1 per year.
Licensing of cold-storage warehouses, rated according to capacity.
Fines for violation of pure food and drugs act.
Fees for licenses, $10 each, and contributions, for credit to division of cannery inspection.
Fees for certified copies of records.
Publications issued by health department:
Biennial report.
Weekly bulletin.

COLORADO

Board of health:
Sherman Williams, M. D., president, Denver.
S. R. McKelvey, M. D., secretary, Denver.
N. M. Burnett, M. D., Lamar.
Ben Beshoar, M. D., Trinidad.
Paul J. Connor, M. D., Denver.
G. W. Bumpus, D. O., Denver.
C. A. Davlin, M. D., Alamosa.
Ura O. Musick, Colorado Springs.
William P. Gasser, M. D., Loveland.
Executive health officer:
*S. R. McKelvey, M. D., secretary, State board of health, Denver.
Bacteriologist:
William C. Mitchell, M. D., Denver.
Epidemiologist:
Merrill C. Jobe, M. D., Denver.
State food and drug commissioner:
*S. H. Loeb, Denver.
Division of social hygiene:
*S. R. McKelvey, M. D., director, Denver.
Division of sanitary engineering:
*Benjamin V. Howe, director, Denver.
Division of plumbing inspection:
*Irving H. Fuller, inspector, Denver.
Appropriations for fiscal years ending June 30, 1930 and 1931:

	1930	1931
Salaries	$27,300	$27,300
Laboratory equipment and supplies	2,000	2,000
Printing and publications	2,800	2,800
Traveling expenses	5,000	5,000
Samples and supplies (food)	300	300
Venereal disease	20,000	20,000
Incidental expenses	1,750	1,750
Total	59,150	59,150

CONNECTICUT

Public health council:
- S. B. Overlock, M. D.
- C. E. A. Winslow, D. P. H.
- James W. Knox.
- James A. Newlands.
- David R. Lyman, M. D.
- Robert A. Cairns, C. E.

Executive health officer:
- *Stanley H. Osborne, M. D., C. P. H., commissioner of health, Hartford.

Bureau of preventable diseases:
- *Millard Knowlton, M. D., C. P. H., director.

Bureau of vital statistics:
- *William C. Welling, director.

Bureau of public-health nursing:
- *Sarah R. Addison, R. N., director.

Bureau of child hygiene:
- *A. Elizabeth Ingraham, M. D.

Bureau of public-health instruction:
- *Elizabeth C. Nickerson, C. P. H.

Bureau of laboratories:
- *F. Lee Mickle, director.

Bureau of sanitary engineering:
- *Warren J. Scott, director.

Division of occupational diseases:
- *Albert S. Gray, M. D.

Division of venereal diseases:
- *Henry P. Talbot, M. D.

Division of mental hygiene:
- *James L. McCartney, M. D., chief.

Division of mouth hygiene:
- Clyde R. Salmons, D. D. S., chief.

Division of medical registration:
- *Ruth H. Monroe, chief.

Appropriation for fiscal period ending June 30, 1931 (two years), $648,619.

Publications issued by health department:
- Weekly bulletin.
- Monthly bulletin.
- Annual vital-statistics report.
- Annual report of State department of health.
- Miscellaneous pamphlets.

DELAWARE

State board of health:
- William P. Orr, M. D., president, Lewes.
- Mrs. Charles Warner, vice president, Wilmington.
- Robert E. Ellegood, M. D., Wilmington.
- Margaret I. Handy, M. D., Wilmington.
- Mrs. F. G. Tallman, Wilmington.
- W. R. Pierce, M. D., Milford.
- Mrs. Arthur Brewington, Delmar.
- Charles R. Jefferis, jr., D. D. S., Wilmington,

Executive health officer:
- *Arthur C. Jost, M. D., C. M., Dover.

Director of laboratory:
- *Rowland D. Herdman, Dover.

Director of child hygiene:
- *Clealand A. Sargent, M. D., Dover.

Sanitary engineer:
- *Richard C. Beckett, Dover.

Superintendent of Brandywine sanatorium:
- *Lawrence D. Phillips, M. D., Marshallton.

Superintendent of Edgewood sanatorium:
- *Elizabeth Van Vranken, R. N., Marshallton.

County unit officers:
- *J. R. Downs, M. D., New Castle County.
- *E. F. Smith, M. D., Kent County
- *E. Reynolds, M. D., Sussex County.

Appropriations for each fiscal year ending June 30, 1932 and 1933:

General administration	$90,000
Hygienic laboratory	10,500
Edgewood sanatorium for colored tuberculous patients	19,000
Brandywine sanatorium for white tuberculous patients	65,000
Total	184,500
Permanent improvement of Brandywine sanatorium for white tuberculous patients (1931–32)	173,000
Special vote for Edgewood sanatorium	20,000
State dental hygienists:	
For 1932	12,000
For 1933	14,000

Publications:
- Biennial report.
- Bi-monthly health news.
- Bulletins on health subjects.

DISTRICT OF COLUMBIA

Executive health officer:
- *William C. Fowler, M. D., health officer, Washington.

Assistant health officer:
- *Edward J. Schwartz, M. D., Washington.

Chief clerk and deputy health officer:
- *Arthur G. Cole, Washington.

Chief, bureau of preventable diseases, and director bacteriological laboratory:
- *James G. Cumming, M. D., Washington.

Bacteriologist:
- *John E. Noble, Washington.

Serologist:
- *Jesse P. Porch, D. V. M., Washington.

Chemist:
- *John B. Reed, Washington.

Chief sanitary inspector:
- *J. Frank Butts, Washington.

Director child hygiene service:
- *Hugh J. Davis, M. D., Washington.

Chief food inspector:
- *Reid R. Ashworth, D. V. S., Washington.

Chief medical and sanitary inspector of schools:
- *Joseph A. Murphy, M. D., Washington.

Micro-analyst:
- *Edwin R. Donaldson, Washington.

Appropriations for the fiscal year ending June 30, 1932:

Salaries	$189,530
Prevention of communicable diseases	38,000
Isolation wards at hospitals	27,000
Milk and food inspection and regulation	8,300
Dispensary service, including treatment of tuberculosis and venereal diseases	29,000

Appropriations for the fiscal year ending June 30, 1932—Continued.

Maintaining a child hygienic service	$54,000
Hygiene and sanitation, public schools	96,830
Laboratory service	2,600
Miscellaneous	3,700
Total	448,960

Publications issued by health department:
- Weekly report by health department.
- Annual report of health officer.
- Monthly statement of average grade of milk sold.

FLORIDA

Board of health:
- H. Mason Smith, M. D., president, Tampa.
- Henry E. Palmer, M. D., Tallahassee.
- Edward M. L'Engle, M. D., Jacksonville.

Executive health officer:
- *Henry Hanson, M. D., State health officer, Jacksonville.

Diagnostic laboratories:
- *Paul Eaton, M. D., D. P. H., acting director, Jacksonville.

Bureau of vital statistics:
- *Stewart G. Thompson, D. P. H., director, Jacksonville.

Bureau of communicable diseases:
- *F. A. Brink, M. D., director, Jacksonville.

Bureau of sanitary engineering:
- *E. L. Filby, C. E., director, Jacksonville.

Bureau of child hygiene and public health nursing:
- *Lucile Spire Blachly, M. D., director, Jacksonville.

Appropriation for health department:
- One-half mill tax levied upon the assessable property of the State for the year ending June 30, 1930.
- Publications issued by health department.
- Pamphlets covering all phases of public health.
- Public health information disseminated through the weekly and daily papers of the State.
- Florida health notes.
- Annual reports.

GEORGIA

Board of health:
- Robert F. Maddox, president, Atlanta.
- James H. McDuffie, M. D., vice president, Columbus.
- T. F. Abercrombie, M. D., secretary, Atlanta.
- C. L. Ridley, M. D., Macon.
- A. D. Little, M. D., Thomasville.
- W. R. Neal, Savannah.
- D. M. Carter, M. D., Madison.
- J. G. Dean, M. D., Dawson.
- John A. Rhodes, M. D., Crawfordville.
- A. C. Shamblin, M. D., Rome.
- J. G. Williams, D. D. S., Buford.
- M. M. Parks, D. D. S., Valdosta.
- W. A. Rivers, M. D., Glenwood.
- M. L. Duggan, State superintendent of schools, ex officio, Atlanta.
- J. M. Sutton, State veterinarian, ex officio, Atlanta.

Executive health officer:
- *T. F. Abercrombie, M. D., commissioner, Atlanta.
- *Joe P. Bowdoin, M. D., deputy commissioner, Atlanta.

Division of venereal-disease control:
- *Joe P. Bowdoin, M. D., director, Atlanta.

Division of county health work:
- *M. E. Winchester, M. D., director, Atlanta.

Division of laboratories:
- *T. F. Sellers, director, Atlanta.

Division of sanitary engineering:
- *L. M. Clarkson, director, Atlanta.

State tuberculosis sanatorium:
- *M. F. Haygood, M. D., Superintendent, Alto.

Bureau of vital statistics:
- *Butler Toombs.

Division of child hygiene.
- *Joe P. Bowdoin, M. D., director, Atlanta.

Georgia training school for mental defectives:
- *John W. Oden, M. D., superintendent.

Division of accounting and purchasing:
- *C. L. Tinsley, director, Atlanta.

Appropriations for the fiscal year ending Dec. 31, 1929:

General appropriation	$150,000
Venereal-disease control	10,000
Maternity and infant hygiene	5,000
State tuberculosis sanatorium	250,000
Georgia training school for mental defectives	72,270
Total appropriation by legislature	487,270
Central administration, county health work (International Health Board funds)	4,200
Central administration, malaria control (International Health Board funds)	3,500
Grand total	494,970

HAWAII

Board of health:
- F. E. Trotter, M. D., president and executive officer, Honolulu.
- Harry R. Hewitt, attorney general, Honolulu.
- Grover A. Batten, M. D., Honolulu.
- D. S. Bowman, Honolulu.
- Gordon C. Ross, Honolulu.
- James A. Williams, Honolulu.
- J. Platt Cooke, Honolulu.

Executive health officer:
- *F. E. Trotter, M. D., president of the board of health, Honolulu.

Secretary:
- *Mae R. Weir, Honolulu.

Bureau of sanitation:
- *S. W. Tay, director, Honolulu.
- *Robert L. Lam, sanitary engineer, Honolulu.
- *A. K. Arnold, division supervisor, Oahu, Honolulu.
- *Clifford H. Bowman, division supervisor, Island of Hawaii, Hilo.
- *R. C. Lane, division supervisor, Island of Maui, Wailuku.
- *A. P. Christian, division supervisor, Island of Kauai, Lihue.

Health officer, Island of Hawaii:
*Joseph S. Caceres, Hilo.
Bureau of vital statistics:
*M. H. Lemon, registrar general, Honolulu.
Bacteriologist:
Niles P. Larson, M. D., Honolulu.
Tuberculosis bureau:
*S. E. Doolittle, M. D., Honolulu.
Bureau of public health nursing:
*Mabel L. Smyth, R. N., director, Honolulu.
Food commissioner and analyst:
*M. B. Bairos, Honolulu.
Territorial hospital:
*A. B. Kroll, superintendent, Kaneohe, Oahu.
*A. B. Eckerdt, M. D., medical superintendent, Kaneohe, Oahu.
Bureau of communicable diseases:
Lyle G. Phillips, M. D., director, Honolulu.
Health officer, Island of Kauai:
A. M. Ecklund, M. D., Koloa.
Bureau of maternal and infant hygiene and child welfare:
Frederick K. Lam, M. D., physician-director, Honolulu.
Bacteriologist, Island of Hawaii:
*Fred S. Paine, Hilo.
Bacteriologist, Island of Maui:
G. H. Lightner, M. D., Puunene.
Bacteriologist, Island of Kauai:
A. M. Ecklund, M. D., Koloa.

Appropriations, 1931–1933:

Board of health—General office—	
Salary, president	$14,400
Other personal services	64,080
Other current expenses	14,990
Equipment	1,561
Bureau of vital statistics—	
Personal services	30,240
Other current expenses	9,800
Equipment	2,600
Bureau of sanitation—	
Personal services	165,600
Other current expenses	25,000
Equipment	1,015
Motor vehicles	4,650
Plague campaign—	
Personal services	32,400
Other current expenses	16,000
Equipment	595
Quarantine service: General service—	
Personal services	23,520
Other current expenses	38,000
Equipment	500
Motor vehicles	800
Quarantine service: Quarantine stations—	
Personal services	6,120
Other current expenses	8,000
Equipment	450
Bacteriological laboratories—	
Personal services	18,000
Other current expenses	3,000
Equipment	500
Agents (Government physicians)—	
Personal services	79,800

Appropriations, 1931–1933—Continued.

Pure food and drugs—	
Personal services	$21,600
Other current expenses	3,500
Equipment	300
Tuberculosis: Government hospital (Puumaile home)—	
Personal services	53,570
Other current expenses	71,474
Equipment	8,904
Buildings	4,000
Tuberculosis: private hospitals—	
Contributions to Leahi home	200,000
Contributions to Kula Sanitarium	115,000
Contributions to Samuel Mahelona memorial hospital	80,000
Bureau of public health nursing—	
Personal services	150,120
Other current expenses	27,850
Equipment	3,055
Motor vehicles	10,000
Tuberculosis bureau—	
Personal services	18,600
Other current expenses	11,292
Equipment	2,000
Bureau of maternal and infant hygiene and child welfare—	
Personal services	8,400
Other current expenses	4,900
Equipment	1,500
Territorial hospital—	
Personal services	355,720
Other current expenses	250,673
Equipment	24,000
Kapiolani girls' home—	
Personal services	11,280
Other current expenses	35,000
Equipment	1,550
Kalihi boys' home—	
Personal services	25,320
Other current expenses	36,000
Equipment	1,250
Boards of examiners—	
Personal services	250
Other current expenses	700
Total	2,099,429

Publications issued by health department:
Annual report of president.
Registrar general's report.
Monthly morbidity and mortality report.

IDAHO

Department of public welfare:
*Lewis Williams, Commissioner.
*W. V. Leonard, B. S. M. E., State chemist and sanitary engineer.
R. L. Nourse, M. D., public health adviser.
*Lawrence J. Peterson, B. S. Agr., bacteriologist.
*A. W. Klotz, assistant bacteriologist.
*R. J. Harding, dairy, food, drug, hotel, and sanitary inspector.

Department of public welfare—Continued.
*Floyd E. Landers, dairy, food, drug, hotel, and sanitary inspector.
Executive health officer:
*Lewis Williams, commissioner of public welfare, Boise.
Bureau of child hygiene:
*Lewis Williams, commissioner, ex officio State director, Boise.
Appropriations for biennial period ending December 31, 1932:

Personal services	$48,360
Other expenses	17,800
Venereal-disease control	5,500
Child hygiene	4,400
Total	76,060

ILLINOIS

Board of public-health advisers:
Clifford U. Collins, M. D., chairman.
James H. Hutton, M. D., secretary.
R. J. Coultas, M. D., vice chairman.
Arnold H. Kegel, M. D.
W. A. Evans, M. D.
Executive health officer:
*Andy Hall, M. D., director of public health, Springfield.
Assistant director of public health:
*A. C. Baxter, M. D.
Division of sanitation and engineering:
*Harry F. Ferguson, C. E., chief sanitary engineer.
Division of communicable diseases:
*J. J. McShane, M. D., D. P. H., chief.
Division of child hygiene and public-health nursing:
*Grace S. Wightman, M. D., chief.
Division of tuberculosis:
*A. C. Baxter, M. D., acting chief.
Division of laboratories:
*Howard J. Shaughnessy, Ph. D, chief.
Division of vital statistics:
*Sheldon L. Howard, registrar.
Division of public-health instruction:
*Baxter K. Richardson, chief.
Division of social hygiene:
*C. C. Copelan, M. D., chief.
Division of hotel and lodging house inspection:
*William F. Behrens, superintendent.
Appropriations for biennial period ending June 30, 1933:

Salaries	$816,000
Salaries State officers	32,000
Office expenses	26,506
Traveling expenses	134,900
Operation	247,199
Repairs and equipment	28,137
Contingent	32,700
Printing	60,000
Postage	20,000
Sanitary water board law	30,000
Rabies	6,000
Total	1,433,442

Publications issued by health department:
Illinois Health Quarterly.
Illinois Health Messenger (bimonthly).
Weekly press bulletin.
Educational health circulars.

INDIANA

Board of health:
A. J. Hostetler, M. D., president, Lagrange.
A. C. McDonald, M. D., Warsaw.
John H. Hare, M. D., Evansville.
T. W. Oberlin, M. D., Hammond.
William F. King, M. D., secretary, Indianapolis.
Executive health officer.
*William F. King, M. D., State health commissioner, Indianapolis.
Epidemiologist and assistant secretary:
*V. K. Harvey, M. D., Indianapolis.
Division of vital statistics.
*H. M. Wright, director, Indianapolis.
Laboratory of hygiene:
*C. F. Adams, M. D., director, Indianapolis, B. S. A.
Division of chemistry:
*I. L. Miller, State food and drug commissioner, director, Indianapolis.
Department of dairy products:
*Frank C. Wilson, director, Indianapolis.
Department of sanitary engineering:
*Lewis S. Finch, director, Indianapolis.
Food and drug laboratory:
*Frank J. Koehne, director, Indianapolis.
Division of child hygiene:
*Ada E. Schweitzer, M. D., director, Indianapolis.
Division of communicable diseases:
*H. W. McKane, M. D, director, Indianapolis.
Division of school hygiene:
*H. R. Condrey, director, Indianapolis.
Division of housing and industrial hygiene:
*A. E. Wert, director, Indianapolis.
Division of public-health nursing:
*Eva F. MacDougall, R. N., director, Indianapolis.
Appropriations for biennial period ending September 30, 1933, $274,000 per annum.

IOWA

State department of health:

EX OFFICIO

Dan W. Turner, governor, Des Moines.
G. C. Greenwalt, secretary of state, Des Moines
R. E. Johnson, treasurer of state, Des Moines.
J. W. Long, auditor of state, Des Moines.
M. G. Thornburg, secretary of agriculture, Des Moines.
D. C. Steelsmith, M. D., State commissioner of health, Des Moines.

APPOINTIVE BY GOVERNOR

H. W. Plummer, M. D., president, Lime Springs.
C. T. Lesan, M. D., Mount Ayr.
W. A. Seidler, M. D., Jamaica.
J. D. Lowry, M. D., Fort Dodge.
Arthur J. Weaver, M. D., Muscatine.
Executive health officer:
*D. C. Steelsmith, M. D., C. P. H., commissioner of health, Des Moines.
*Joseph H. Kinnaman, M. D., deputy commissioner of health, Des Moines.

Chief clerk:
*Lynn Clemens, Des Moines.
Secretary:
*Naomi B. Wherry, Des Moines.
Division of preventable diseases:
*Howard A. Lanpher, M. D., C. P. H., director and epidemiologist, Des Moines.
Cooperative county health units:
*E. R. Coffey, M. D.
Division of vital statistics:
*R. L. McLaren, director, Des Moines.
Division of sanitary engineering:
*A. H. Wieters, C. E., director, Des Moines.
Division of nursing education:
*Maude E. Sutton, R. N., director, Des Moines.
Division of examinations and licensures:
*H. W. Grefe, director, Des Moines.
Division of law enforcement:
*Herman B. Carlson, LL. D., inspector, Des Moines.
*George N. Lyman, assistant inspector, Des Moines.
Division of barber inspection:
*John T. McGruder, chief inspector, Des Moines.
Dvision of cosmetology inspection:
*Naomi M. Krause, secretary, Des Moines.
Division of maternity and child hygiene:
*Clara E. Hayes, M. D., director, Des Moines.
Public health nursing—
*Edith S. Countryman, R. N., director, Des Moines.
Housing work is carried on by engineering division.
Medical, nurses, dental, optometry, cosmetology, chiroptractic, osteopathy, embalming, podiatry, and barber examining boards are combined in State department of health.
Appropriations for fiscal year ending June 30, 1931:

For salaries and wages	$38,200
Miscellaneous traveling	3,500
Antitoxin, vaccine, and other prophylactics	10,000
Sanitary engineering and housing—	
Salaries and wages	15,200
Traveling	6,000
Equipment and laboratory	1,000
Quarantine enforcement and other contingencies	4,000
Traveling epidemiologist	1,200
Stream pollution	1,000
Maternity and child hygiene:	
Salaries and wages	8,350
Traveling expenses	3,000
Tuberculosis and other activities	3,000
Replacing car	1,500
Total	95,950

Publications:
Biennial report.
Quarterly bulletin.
Health news-letter.

KANSAS

Board of health:
Clarence A. McGuire, M. D., president, Topeka.
H. L. Aldrich, M. D., vice president, Caney.
George L. Thacher, M. D., Waterville.

Board of health—Continued.
John H. Henson, M. D., Mound Valley.
Charles W. Robinson, M. D., Atchison.
Clay E. Coburn, M. D., Kansas City.
C. M. Jenney, M. D., Salina.
Anna Perkins, M. D., El Dorado.
Walter J. Eilerts, M. D., Wichita.
Thomas H. Finnigan, attorney, Kansas City.
Executive health officer:
*Earle G. Brown, M. D., secretary State board of health, Topeka.
Division of vital statistics:
*W. J. Davies, State registrar.
Division of communicable diseases:
*C. H. Kinnaman, M. D., epidemiologist, Topeka.
Division of foods and drugs:
*Thomas I. Dalton, Ph. C., assistant chief food and drug inspector, Topeka.
Division of child hygiene:
*J. C. Montgomery, M. D., chief, Topeka.
Division of rural sanitation:
*J. C. Montgomery, M. D., director, Topeka.
Division of water and sewage:
Earnest Boyce, chief, Lawrence.
Division of public-health education:
*Earle G. Brown, M. D., director, Topeka.
Division of venereal diseases:
*Earle G. Brown, M. D., director, Topeka.
Water and sewage laboratories at Kansas University:
Earnest Boyce, director, Lawrence.
Food laboratory at Kansas University:
Prof. E. H. S. Bailey, director of food analysis, Lawrence.
Drug laboratory at Kansas University:
Prof. L. D. Havenhill, director of drug analysis, Lawrence.
Food laboratory at Kansas Agricultural College:
Prof. H. H. King, director of food analysis, Manhattan.
Public-health laboratory, Topeka:
*Earle G. Brown, M. D., acting director, Topeka.
Appropriations for the fiscal year ending June 30, 1930:

	Salaries	Total
Executive	$5,800	$8,750
Division of communicable diseases	4,500	10,700
Divison of food and drugs	10,400	15,400
Division of child hygiene	7,300	10,000
Division of cooperative county health work		7,500
Public health laboratory, including appropriation for the purchase of arsphenamine for the treatment of indigent cases of syphilis	6,340	10,000
Division sanitation		3,000
Board members		1,250
Total	34,340	66,600

Other sources of revenue:
Marriage fees, approximately $20,000.
Water and ice analysis fees, approximately $14,000.

Publications issued by health department:
- Biennial report.
- Weekly morbidity report.

KENTUCKY

Board of health:
- E. M. Howard, M. D., president, Harlan.
- Geo. S. Coon, M. D., Louisville.
- A. T. McCormack, M. D., secretary, Louisville.
- J. Watts Stovall, M. D., Grayson.
- Lawrence T. Minish, M. D., Frankfort.
- B. B. Keys, M. D., Murray.
- F. L. Johnson, M. D., Livermore.
- C. J. Johnson, D. O., Louisville.
- Addison Dimmitt, Louisville.

Executive health officer:
- *A. T. McCormack, M. D., D. P. H., State health, officer, Louisville.

Bureau of county health work:
- *P. E. Blackerby, M. D., director and assistant State health officer, Louisville.
- *F. W. Forge, M. D., assistant, Louisville.
- *V. A. Stilley, M. D., assistant, Benton.

Bureau of vital statistics:
- *J. F. Blackerby, director, Louisville.

Bureau of bacteriology:
- *Lillian H. South, M. D., director, Louisville.

Bureau of sanitary engineering:
- *F. C. Dugan, C. E., director, Louisville.

Bureau of food, drugs, and hotels:
- *Sarah Vance Dugan, director, Louisville.

Bureau of venereal diseases:
- *Jethra Hancock, M. D., Louisville.

Bureau of public health nursing:
- *Margaret East, R. N., director, Louisville.

Bureau of maternal and child health:
- *Annie S. Veech, M. D., director, Louisville.
- *Juanita Jennings, M. D., assistant.

Bureau of prevention of trachoma and blindness:
- *C. B. Kobert, M. D., director, Louisville.

Bureau of budget:
- *Elva V. Grant, director, Louisville.

Bureau of epidemiology:
- *J. L. Jones, M. D., director, Louisville.

Bureau of tuberculosis and State tuberculosis sanitarium:
- *Paul A. Turner, M. D., director and superintendent, Louisville.

Bureau of dental health:
- J. F. Owen, D. D. S., director, Lexington.

Legislative appropriation for fiscal year ending June 30, 1932, $281,134.

Publications issued by health department:
- Monthly bulletin.

LOUISIANA

Board of health:
- J. A. O'Hara, M. D., president, New Orleans.
- L. A. Guidry, M. D., Sunset.
- L. Roland Young, M. D., Covington.
- S. de Nux, M. D., Marksville.
- J. L. Kelly, M. D., Oak Grove.
- (Other members to be appointed.)
- Fannie B. Nelken, secretary.

Executive health officer:
- *J. A. O'Hara, M. D., president, board of health, New Orleans.

Bacteriologist:
- W. H. Seemann, M. D., New Orleans.

Registrar vital statistics:
- J. Geo. Dempsey, M. D., New Orleans.

Mosquito-malaria control:
- *W. T. Browne, Ph. D., M. D., director, New Orleans.

Bureau of mental hygiene:
- H. R. Unsworth, M. D., director, New Orleans.

Research information:
- *P. A. Kibbe, M. D.

Dairy and medical inspection:
- E. J. deBergue, M. D., New Orleans.

Bureau of public health administration:
- *George S. Bote, executive assistant, U. S. P. H. S., acting director, New Orleans.

Sanitary engineer:
- *John H. O'Neill, New Orleans.

Analyst:
- *Cassius L. Clay, New Orleans.

Bureau of animal industry:
- *G. T. Jackson, D. V. S., director, New Orleans.

Sanitary inspection:
- Peter Rohrs, jr., chief, New Orleans.

Auditor:
- Phil Arras, New Orleans.

Appropriations for fiscal year:
- 1930–31, $406,000.
- 1931–32, $406,000.

Publications issued by health department:
- Quarterly bulletin.
- Biennial report.
- Miscellaneous leaflets.

MAINE

Public health council:
- C. F. Kendall, M. D., chairman, Augusta.
- H. A. Kelley, D. D. S., Portland.
- Annie Peabody, Portland.
- J. G. Towne, M. D., Waterville.
- O. R. Emerson, M. D., Newport.
- Mrs. Agnes B. Hall, Hampden.

Executive health officer:
- *C. F. Kendall, M. D., State commissioner of health, Augusta.

Division of administration:
- *C. F. Kendall, M. D., Augusta.

Division of communicable diseases:
- *William L. Holt, C. P. H., M. D., director, Augusta.

Division of laboratories:
- *Alfred G. Long, M. D., C. P. H., Augusta.

Division of sanitary engineering:
- *Elmer W. Campbell, D. P. H., Augusta.

Division of vital statistics:
- *C. F. Kendall, M. D., State registrar, Augusta.

Division of social hygiene:
- *William L. Holt, C. P. H., M. D., director, Augusta.

Division of public health nursing and child hygiene:
- *Edith L. Soule, R. N., Augusta.

Division of dental hygiene:
- *Dorothy Bryant, D. H., Augusta.

District health officers:
- *J. L. Pepper, M. D., South Portland.
- *E. P. Goodrich, M. D., Winterport.
- *R. L. Mitchell, M. D., Lewiston.
- *G. H. Hutchins, M. D., Waterville.
- *L. W. Hadley, Ph. B., M. D., Machias.

District health officers—Continued.
*James W. Loughlin, M. D., Newcastle.
*B. F. Porter, M. D., Caribou.

Appropriations for fiscal year ending June 30, 1931:

Salaries and clerk hire	$39,000
Office expense and epidemic fund	22,000
District and local health officers	40,000
Venereal-disease control work	14,000
Maternity and child-welfare work	25,000
Branch State laboratory, Caribou	3,000
Aid for typhoid carriers	5,000
Total	148,000

Other sources of revenue:
Census Bureau, Washington, D. C., about $800.
License fees from camps, roadside eating and lodging places, about $12,000

MARYLAND

Board of health:
Robert H. Riley, M. D., chairman, Baltimore.
Thomas S. Cullen, M. D., Baltimore.
Wm. P. Lane, jr., attorney general, Baltimore.
William W. Ford, M. D., Baltimore.
C. Hampson Jones, M. D., Baltimore.
Tolley A. Biays, Baltimore.
Benjamin C. Perry, M. D., Bethesda.
E. F. Kelly, Phar. D., Baltimore.
Burt B. Ide, D. D. S., Baltimore.

Executive health officer:
***Robert H. Riley, M. D., Dr. P. H.**, director of health, Baltimore.

Division of personnel and accounts:
*Walter N. Kirkman, chief, Baltimore.

Division of oral hygiene:
*Richard C. Leonard, D. D. S., chief, Baltimore.

Division of legal administration:
*J. Davis Donovan, chief, Baltimore.

Committee on public health education:
*Gertrude B. Knipp, secretary, Baltimore.

Bureau of communicable diseases:
*Robert H. Riley, M. D., Dr. P. H., chief, Baltimore.
*C. H. Halliday, M. D., epidemiologist, Baltimore.
*C. W. G. Rohrer, M. D., diagnostician, Baltimore.

Bureau of vital statistics:
*John Collinson, M. D., Dr. P. H., chief, Baltimore.

Food and drug commissioner:
*A. L. Sullivan, chief, Baltimore.

Deputy food and drug commissioner:
*R. L. Swain, Ph. D.

Bureau of bacteriology:
*C. A. Perry, chief, Baltimore.

Bureau of sanitary engineering:
*Abel Wolman, B. S. E., chief, Baltimore.

Bureau of chemistry:
*John C. Krantz, jr., chief, Baltimore.

Bureau of child hygiene:
*J. H. Mason Knox, jr., M. D., chief, Baltimore.

Appropriations for fiscal year ended September 30, 1930:

Salaries	$280,317
Expenses	149,375
Emergency appropriation (epidemics, etc.)	10,000
Total	439,692

Publications issued by health department:
Annual report.
Weekly News Letter.
Monthly bulletin.

MASSACHUSETTS

Public health council:
George H. Bigelow, M. D , chairman, Boston.
Roger I. Lee, M. D., Boston.
Francis H. Lally, M. D., Milford.
Richard P. Strong, M. D., Boston.
Sylvester E. Ryan, M. D., Springfield.
James L. Tighe, Holyoke.
Gordon Hutchins, Concord.

Executive health officer:
***George H. Bigelow, M. D.**, State Commissioner of public health, Boston.

Secretary.
*Alice M. Ethier.

Division of administration:
(Under direction of commissioner.)

Division of communicable diseases:
*Gaylord W. Anderson, M. D., director, Boston.

Division of sanitary engineering:
*Arthur D. Weston, C. E., director and chief engineer, Boston.

Division of water and sewage laboratories:
*H. W. Clark, director and chemist, Boston.

Division of biologic laboratories:
*Benjamin White, Ph. D., director and pathologist, Boston.

Division of food and drugs:
*Hermann C. Lythgoe, director and analyst, Boston.

Division of child hygiene:
*M. Luise Diez, M. D., director, Boston.

Division of tuberculosis sanatoria:
*Alton S. Pope, M. D., director, Boston.

Division of adult hygiene:
*Herbert L. Lombard, M. D., director, Boston.

Appropriations for department of public health, 1931:

Division of administration—	
Salary of commissioner	$7,500
Personal services	20,100
Services other than personal	14,800
Division of child hygiene—	
Personal services of director and assistants	38,750
Services other than personal	21,000
Personal services in connection with maternal and infant hygiene	21,800
Expenses in connection with maternal and infant hygiene	14,900

Appropriations for Department of public health, 1931—Continued.

Division of communicable diseases—	
Personal services of director, district health officers, etc	$74,500
Services other than personal	20,500
Personal services in connection with control of venereal diseases	13,800
Expenses in connection with control of venereal diseases	30,000
Wassermann Laboratory—	
For personal services	16,600
For expenses of laboratory	5,200
Antitoxin and vaccine laboratory—	
For personal services	71,000
Other services	42,500
Inspection of food and drugs—	
For personal services	54,200
Other services	14,000
For administering the shellfish law—	
Personal services	2,280
Other services	1,890
Water supply and disposal of sewage, engineering division—	
For personal services	71,000
For other services	22,000
Water supply and disposal of sewage, division of water and sewage laboratories—	
For personal services	44,000
For other services	8,000
Division of tuberculosis—	
For personal services	41,700
Services other than personal	9,700
For personal services of tuberculosis clinic units	60,000
Services other than personal (clinic units)	35,600
Payment of subsidies	281,000
For maintenance of and for certain improvements at the Lakeville, North Reading, Rutland, and Westfield State sanatoria	1,259,440
Division of adult hygiene—	
For personal services	44,500
For other expenses	41,700
Cancer hospital at Norfolk—	
For maintenance of and for certain improvements	255,050
Total	2,659,010

MICHIGAN

Advisory council of health:

——— ———.

Robert B. Harkness, M. D., Houghton.
Chalmers J. Lyons, D. D. Sc., Ann Arbor.
Louis J. Hirschman, M. D., Detroit.
Karl B. Brucker, M. D., Lansing.
George H. Curry, M. D., Flint.

Executive health officer:

*C. C. Slemons, M. D., Dr. P. H., State health commissioner, Lansing.

Bureau of engineering:

*E. D. Rich, C. E., director.
*John M. Hepler, assistant engineer.
*Willard F. Shephard, B. S. E., assistant engineer.
*Raymond J. Faust, assistant engineer.
*Herbert H. Hasson, assistant engineer.
*Orla E. McGuire, assistant engineer.

Bureau of laboratories:

*C. C. Young, Ph. D., Dr. P. H., director.
*Wm. E. Bunney, Ph. D., associate director.
*Minna Crooks, R. N., bacteriologist.
*M. B. Kurtz, D. V. M., serologist.
*Pearl Kendrick, bacteriologist, West Michigan division.
*Ora Mills, bacteriologist, Houghton branch.
*A. B. Haw, clinical pathologist.
*Newton D. Larkum, Ph. D., immunologist.
*Roy W. Pryor, Dr. P. H., immunologist.
*Charles L. Bliss, toxicologist.
*Bruce Robinson, superintendent, biologic plant.

Bureau of child hygiene and public health nursing:

*Lillian R. Smith, M. D., director.
*Muriel A. Case, M. D., physician.
*Ida M. Alexander, M. D., prenatal consultant.
*Helen de Spelder Moore, R. N., assistant director.

Bureau of records and statistics:

*W. J. V. Deacon, M. D., director.

Bureau of education:

*Marjorie Delavan, director.
*Pearl Turner, assistant director.
*Melita Hutzel, lecturer.

Bureau of embalming:

*Frank J. Pienta, director.

Bureau of epidemiology:

*C. D. Barrett, M. D., C. P. H., director.
*W. J. Murphy, M. D., M. P. H., field epidemiologist.

Bureau of mouth hygiene:

*William R. Davis, D. D. S., director.

Appropriations for fiscal year ending June 30, 1932:

Personal services	$271,000
Supplies; Contractual service	120,000
Outlay for equipment	4,000
Total	395,000
County health departments	80,000
Resort and roadside water inspection	10,000
Plumbing division	20,000
Smallpox vaccine, toxoid mfg	10,000
Grand total	465,000

Publications issued by health department:

Monthly bulletin.
Annual report.
Communicable disease pamphlets.
Sex hygiene pamphlets.
Child hygiene pamphlets.
Engineering bulletins.
Mouth hygiene pamphlets.
Scientific reprint series.
Rules and regulations.

MINNESOTA

Board of health:
- J. A. Thabes, sr., M. D., president, Brainerd.
- N. G. Mortensen, M. D., vice president, St. Paul.
- H. R. Weirick, M. D., Hibbing.
- C. L. Scofield, M. D., Benson.
- N. M. Watson, M. D., Red Lake Falls.
- C. I. Oliver, M. D., Graceville.
- A. S. Milinowski, C. E., St. Paul.
- W. H. Barr, M. D., Wells.
- Frederic Bass, Minneapolis.

Executive health officer, Old Capitol, St. Paul:
- *A. J. Chesley, M. D., secretary and executive officer.

Division of administration, Old Capitol, St. Paul:
- *O. C. Pierson, director.

Division of vital statistics, Old Capitol, St. Paul:
- *Gerda C. Pierson, director.

Division of hotel inspection, Old Capitol, St. Paul:
- *I. C. Strout, State hotel inspector.

Division of preventable diseases (including venereal diseases), university campus, Minneapolis:
- *O. McDaniel, M. D., director.
- *Lucy Heathman, Ph. D., chief of laboratories.
- *W. P. Greene, M. D., epidemiologist.
- *James E. Perkins, M. D., epidemiologist.
- *Ralph R. Sullivan, M. D., epidemiologist.

Division of sanitation, university campus, Minneapolis:
- *H. A. Whittaker, director.
- *O. E. Brownell, C. E., senior sanitary engineer.

Division of child hygiene, university campus, Minneapolis:
- Everett C. Hartley, M. D., director.
- *Olivia Peterson, R. N., superintendent of public-health nursing.

Appropriation for fiscal year ending June 30, 1932:

Maintenance and vital statistics—	
Salaries	$33,290
Expenses	8,500
	41,790
Providing free antitoxin and other biological products	5,000
Venereal diseases and venereal disease education	22,500
Sanitary engineering and laboratory	30,000
Preventable diseases and laboratory	70,800
Protection for maternity and infancy	34,500
Indian health work	10,000
Hotel inspection	42,000
Stream pollution survey	5,000
Printing of report	1,800
Total	263,390

Publications issued by health department:
- Educational pamphlets.

MISSISSIPPI

Board of health:
- J. W. Lipscomb, M. D., president, Columbus.
- Felix J. Underwood, M. D., secretary, Jackson.
- S. E. Eason, M. D., New Albany.
- L. B. Austin, M. D., Rosedale.
- W. A. Dearman, M. D., Gulfport.

Board of health—Continued.
- B. J. Shaw, M. D., Slate Springs.
- W. H. Frizell, M. D., Brookhaven.
- John Darrington, M. D., Yazoo City.
- Dudley Stennis, M. D., Newton.
- Wm R Wright, D. D. S., Jackson.

Executive health officer:
- *Felix J. Underwood, M. D., secretary, State board of health, Jackson.

Bureau of vital statistics:
- *R. N. Whitfield, M. D., director, Jackson.

Bureau of child hygiene and public health nursing:
- *Felix J. Underwood, M. D., acting director, Jackson.
- *Mary D. Osborne, R. N., supervisor, public health nursing, Jackson.
- *Gladys Eyrich, supervisor oral hygiene, Jackson.

Hygienic laboratory:
- *T. W. Kemmerer, M. D., director, Jackson.

Bureau of sanitary engineering:
- *H. A. Kroeze, C. E., director, Jackson.
- *N. M. Parker, D. V. S., State sanitary inspector, Jackson.
- *C. M. Ledbetter, State sanitary inspector, Jackson.
- *Floyd Ratliff, State sanitary inspector, Jackson.

Bureau of malaria control:
- *Mark F. Boyd, M. D., C. P. H., director, Jackson.

Bureau of county health work:
- *C. C. Applewhite, M. D., director, Jackson.

Bureau of communicable diseases:
- H. C. Ricks, M. D., C. P. H., director, Jackson.

Bureau of tuberculosis control:
- *Henry Boswell, M. D., director, Sanitorium.

Bureau of industrial hygiene:
- *J. W. Dugger, M. D., director, Jackson.

Field unit:
- *J. A. Milne, M. D., C. P. H., director, Jackson.

State appropriation for period January 1, 1931, to December 31, 1931, $195,000.

Publications issued by health department:
- Biennial report.
- Weekly health letters published in all newspapers of the State.
- Health pamphlets.

MISSOURI

Board of health:
- Francis M. McCallum, M. D., president, Kansas City.
- Horace W. Carle, M. D., vice president, St. Joseph.
- James Stewart, M. D., secretary, Jefferson City.
- H. L. Kerr, M. D., Crane.
- W. A. Clark, M. D., Jefferson City.
- Ed Sanborn Smith, M. D., Kirksville.
- H. S. Gove, M. D., Linn.

Executive health officer:
- *James Stewart, M. D., State health commissioner, Jefferson City.
- *Irl Brown Krause, M. D., assistant State health commissioner, Jefferson City.

Epidemiology:
- *R. L. Russell, M. D., assistant epidemiologist.

Laboratories:
*R. L. Laybourn, bacteriologist.
Sanitary engineering:
*W. Scott Johnson, chief engineer.
Vital statistics:
Ross Hopkins, M. D., statistician.
Child hygiene and cooperative county health work:
*Irl Brown Krause, M. D., director.
Public health nursing:
*Pearl McIver, R. N., director.
Appropriations for biennial period of 1931-32:
Board of health—

Licensure	$40,000
Salaries	163,114
Contingent, operation, additions, repairs and replacements	74,945
Public health fund	159,500
Total	437,559

MONTANA

Board of health:
L. H. Fligman, M D., president, Helena.
B. L. Pampel, M. D., vice president, Livingston.
E. G. Balsam, M. D., Billings.
E. M. Porter, M. D., Great Falls.
George M. Jennings, M. D., Missoula.
Executive health officer:
*W. F. Cogswell, M. D., secretary, Helena.
Division of communicable diseases.
*J. H. Crouch, M. D., epidemiologist, Helena.
Division of child welfare:
*Miss Alma Wretling, R. N., director, Helena.
Division of food and drugs:
*W. F. Cashmore, jr., director, Helena.
Division of vital statistics:
*W. F. Cogswell, M. D., State registrar, Helena.
*L. L. Benepe, deupty State registrar, Helena.
Division of water and sewage:
*H. B. Foote, director, Helena.
W. M. Cobleigh, consultant, Bozeman.
*Jacob W. Forbes, assistant sanitary engineer, Helena.
*Oliver Morgan, analyst, Helena.
Hygienic laboratory:
*Fred D. Stimpert, director, Helena.
*Edith Kuhns, technician, Helena.
E. D. Hitchcock, M. D., consulting bacteriologist, Great Falls.
Appropriations for the years ending—

	June 30, 1932	June 30, 1933
Salaries	$30,050	$30,050
Operating expenses	12,000	12,000
Capital repairs and replacements	1,350	1,350
Division of child welfare	15,000	15,000
Board of entomology (Rocky Mountain spotted-fever work)	13,060	13,060
Total	71,460	71,460

Publications issued by health department:
Special bulletins on communicable diseases.
Biennial report.

NEBRASKA

Department of public welfare:
*P. H. Bartholomew, M. D., assistant secretary, Lincoln.
Bureau of health—
Executive health officer—
*P. H. Bartholomew, M. D., director of public health, Lincoln.
Collaborating epidemiologist—
*P. H. Bartholomew, M. D., Lincoln.
Bacteriologist—
*L. O. Vose, Lincoln.
Division of venereal diseases—
*P. H. Bartholomew, M. D., director, Lincoln.
Statistician—
*Bertha Riesland, Lincoln.
Medical examining board—
W. R. Boyer, M. D., Pawnee City.
H. J. Lehnhoff, M. D., Lincoln.
E. T. McGuire, M. D., Mead.
Appropriations for biennial period ending June 30, 1933:

Salaries	$30,000
Maintenance	15,000
Total	45,000

NEVADA

State board of health:
F. B. Balzar, governor, president, Carson City.
Edward E. Hamer, M. D., secretary and State health officer, Carson City.
W. G. Greathouse, secretary of State.
John Fuller, M. D., Reno.
C. W. West, M. D., Reno.
Executive health officer:
*Edward E. Hamer, M. D., Carson City.
State hygienic laboratory at State university:
*Vera E. Lautenschlager, acting director, Reno.
Appropriations for 1931 and 1932:

Salary of secretary	$5,000
For State board of health	6,000
For purchase of diphtheria antitoxin for free distribution	500
For bureau of vital statistics	500
Total	12,000

Publications issued by health department:
Biennial report.
Special bulletins.

NEW HAMPSHIRE

Board of health:
Robert Fletcher, C. E., president, Hanover.
D. E. Sullivan, M. D., Concord.
George C. Wilkins, M. D., Manchester.
Sibley G. Morrill, M. D., Concord.

Board of health—Continued.
John G. Winant, governor.
Ralph W. Davis, attorney general, Manchester.
Executive health officer:
*Charles Duncan, M. D., secretary, State board of health, Concord.
*Harriet I. Parkhurst, chief clerk, Concord.
Division of maternity, infancy, and child hygiene:
*Mary D. Davis, R. N., director and supervising nurse, Manchester.
Department of vital statistics:
*Charles Duncan, M. D., registrar, Concord.
*Doris P. Bartlett, chief clerk, Concord.
Division of chemistry and sanitation:
*Charles D Howard, chief of division, Concord.
*Frederick Vintinner, assistant chemist, Concord.
*Harriet I. Albee, assistant chemist and bacteriologist, Concord.
*Leonard W. Trager, assistant sanitary engineer, Concord.
*Joseph X. Duval, chief inspector, Concord.
Diagnostic and pathological department—
*William R. Macleod, serologist and diagnostic bacteriologist, Concord.
H. N. Kingsford, M. D., pathologist, Hanover.
*Benj. Jewell, assistant in pathological laboratory, Concord.
Venereal disease division:
*Charles A. Weaver, M. D., Manchester.
Appropriations for fiscal year ending June 30, 1932:

State board of health	$51,950
Laboratory of hygiene	19,100
Vital statistics	3,800
Total	74,850

Publications issued by health department:
Bulletin.
Biennial report.

NEW JERSEY

Board of health:
Charles I. Lafferty, president, Atlantic City.
Harold J. Harder, C. E., vice president, Paterson.
David D. Chandler, Newark.
H. E. Winter, V. M. D., Plainfield.
J. Oliver McDonald, M. D., Trenton.
S. A. Cosgrove, M. D., Jersey City.
Mrs. Helen M. Berry, Newark.
Margaret McNaughton, Jersey City.
J. E. H. Guthrie, D. D. S., Newark.
Frank S. Tainter, C. E., Far Hills.
Executive health officer:
*J. Lynn Mahaffey, M. D., director of health, Trenton.
Bureau of Bacteriology:
*John V. Mulcahy, chief, Trenton.
Bureau of chemistry:
*John E. Bacon, chief, Trenton.
Bureau of administration:
*Charles J. Merrell, chief, Trenton.
Bureau of food and drugs:
*Walter W. Scofield, chief, Trenton.
Bureau of child hygiene:
Julius Levy, M. D., consultant, Trenton.
Bureau of local health administration.
Wm. H. McDonald, acting chief, Trenton.
Bureau of engineering:
*H. P. Croft, chief, Trenton.
Bureau of vital statistics:
*David S. South, chief, Trenton.
Bureau of venereal-disease control:
A J. Casselman, M. D., consultant, Trenton.
Appropriations for fiscal year ending June 30, 1932:

Salaries	$244,100.00
Miscellaneous	128,440.00
Child hygiene	139,056.00
Venereal-disease control	28,112.50
Total	539,708.50

Publications issued by health department:
Monthly bulletin.
Annual report.

NEW MEXICO

Board of public welfare:
Robert O. Brown, M. D., president, Santa Fe.
Mrs. Max Nordhaus, vice president, Albuquerque.
Mrs. Francis C. Wilson, secretary, Santa Fe.
Mrs. Frances E. Nixon, Santa Fe.
J. G. Osburn, Roswell.
Executive health officer:
*J. Rosslyn Earp, Dr. P. H., director of public health, Santa Fe.
Division of sanitary engineering and sanitation:
*Paul S. Fox, M. S. in C. E., chief, Santa Fe.
State supervisor of public-health nursing:
*Eleanor L. Kennedy, R. N., Santa Fe.
Division of county health work:

Public health laboratory:
*Myrtle Greenfield, chief, Albuquerque.
State registrar:
*Miss Billy Tober, Santa Fe.
Appropriation for years 1931-32 and 1932-33, per annum, $38,400. Fiscal year ends June 30.

NEW YORK

Public health council:
Simon Flexner, M. D., LL. D., chairman, New York.
Homer Folks, LL. D., vice chairman, Yonkers.
Henry N. Ogden, C. E., Ithaca.
Frederick F. Russell, M. D., New York.
Jacob Goldberg, M. D., Buffalo.
Stanton P. Hull, M. D., Petersburg.
Thomas Parran, jr., M. D. (ex officio), commissioner of health, Albany.
Executive health officer:
*Thomas Parran, jr., M. D., State commissioner of health, Albany.
Deputy commissioner of health:
*Paul B. Brooks, M. D., Albany.
Administrative officer:
*Fenimore D. Beagle, Albany.
Division of public health education:
*B. R. Rickards, director, Albany.
Division of sanitation:
*Charles A. Holmquist, C. E., director, Albany.

Division of vital statistics:
*Joseph V. De Porte, Ph. D., director, Albany.
Division of maternity, infancy, and child hygiene:
*Elizabeth M. Gardiner, M. D., director, Albany.
Division of communicable diseases:
*Herman F. Senftner, M. D., acting director, Albany.
Division of tuberculosis:
*Robert E. Plunkett, M. D., director, Albany.
Division of social hygiene:
*Albert Pfeiffer, M. D. director, Albany.
Division of laboratories and research:
*Augustus B. Wadsworth, M. D., director, Albany.
Division of public health nursing:
*Mathilde S. Kuhlman, R. N., director, Albany.
Division of orthopedics:
*Walter J. Craig, M. D. director, Albany.
Institute for the study of malignant disease, Buffalo:
*Burton T. Simpson, M. D., director.
New York State Hospital for Incipient Pulmonary Tuberculosis, Ray Brook:
*H. A. Bray, M. D., superindendent.
New York State Reconstruction Home, West Haverstraw:
*John J. Kelly, superintendent.
Appropriations for fiscal year ending June 30, 1932:

Personal service	$1,688,596
Maintenance and operation	972,555
State aid to county laboratories	125,000
State aid to county health activities	365,043
Emergency poliomyelitis fund	115,000
Construction and permanent betterments	1,059,550
Total	4,326,744

Other sources of revenue:
Fees from certified transcripts of birth, death, and marriage certificates, $2,213 90 per annum.
Licensing laboratories, $466.
Sale of serums, $1,309.21.
Licensing of embalmers and undertakers, $10,534.
Registration of embalmers and undertakers, $27,675.
Rental of radium, $600.
Care of county cases at reconstruction house, $27,000.
Refund of transportation of discharged patients from tuberculosis hospital, Ray Brook, $4,000.
Publications issued by health department:
Weekly Health News.
Monthly Vital Statistics Review.
Annual report.

NORTH CAROLINA

Board of health:
J. T. Burrus, M. D., president, High Point.
Carl V. Reynolds, M. D., vice president, Asheville.
G. G. Dixon, M. D., Ayden.
L. B. Evans, M. D., Windsor.
S. D. Craig, M. D., Winston-Salem.
H. Lee Large, M. D., Rocky Mount.
J. N. Johnson, D. D. S., Goldsboro.

Board of health—Continued.
H. G. Baity, Ph. D., Chapel Hill.
J. A. Goode, Ph. G., Asheville.
Executive health officer:
*James M. Parrott, M. D., secretary, and State health officer, Raleigh.
Division of laboratories:
*C. A. Shore, M. D., director, Raleigh.
Division of sanitary engineering:
*Warren H. Booker, C. E., director, Raleigh.
Division of preventive medicine:
*G. M. Cooper, M. D., director, Raleigh.
(a) Child Hygiene.
(b) Health education and vital statistics.
Division of county health activities and epidemiology:
*John H. Hamilton, M. D., director, Raleigh.
Division of dentistry:
*Ernest A. Branch, D. D. S., director, Raleigh.
Appropriations for fiscal year ending June 30, 1932:

Administration	$16,662
County health activities and epidemiology	136,936
Sanitary engineering	49,593
Preventive medicine—	
(a) Child hygiene	45,595
(b) Health education and vital statistics	29,248
Division of laboratories	61,250
Printing	12,716
Total appropriation	352,000

Other sources of revenue: Special fees, $54,806.

NORTH DAKOTA

Advisory health council:
Bertha R. Palmer, superintendent of public instruction, ex officio, Bismarck.
Fannie Dunn Quain, M. D., president North Dakota Tuberculosis Association, ex officio, Bismarck.
Arne Oftedal, M. D., Fargo.
Ella Clayton Smyth, Bismarck.
R. S. Towne, D. D. S., Bismarck.
Executive health officer:
*A. A. Whittemore, M. D., State health officer, Bismarck.
Child hygiene and public health nursing:
*Maysil M. Williams, M. D., director, Bismarck.
Bureau of venereal diseases:
*Robert W. Allen, M. D., Bismarck.
Bureau of sanitary engineering:
*A. L. Bavone.
Bureau of vital statistics:
*Viletta Roche, director.
Appropriations for biennial period ending June 30, 1933:
For public health—

Salary	$7,200
Clerk hire	35,600
Postage	3,000
Supplies	1,500
Furniture and fixtures	900
Printing	6,000
Miscellaneous	1,000
Travel	4,000
Card indexing	2,000

OHIO

Public health council:
- H. S. Southard, M. D., chairman, Columbus.
- James E. Bauman, secretary.
- G. D. Lummis, M. D.
- C. O. Probst, M. D.
- R. M. Calfee.
- W. I. Jones, D. D. S.

Executive health officer:
- *H. S. Southard, M. D., director of health, Columbus.

Assistant director of health:
- *James E. Bauman.

Division of administration:
- *James E. Bauman, chief.
- *O. A. Orrison, chief clerk.
- Bureau of publicity—
  - *Paul Mason, director.
- Bureau of local health organization—
  - *E. R. Shaffer, M. D., chief.

Division of communicable diseases:
- *Finley Van Orsdall, M. D., chief.
- *T. W. Mahoney, M. D., chief epidemiologist.
- Bureau of tuberculosis—
  - *W. D. Tillson, M. D.
- Bureau of venereal diseases—
  - ——— ———
- Bureau of prevention of blindness—
  - ——— ———

Division of sanitary engineering:
- *F. H. Waring, chief.
- Bureau of plumbing inspection—
  - *A. A. Manchester, chief.

Division of vital statistics:
- *Irva C. Plummer, chief.

Division of laboratories:
- *Leo F. Ey, chief.

Division of child hygiene:
- *A. B. Lippert, M. D., chief.
- Bureau of hospitals—
  - *Clara E. Reeder, R. N., chief.
- Bureau of dental hygiene—
  - *L. G. Bean, D. D. S., chief.

Division of public health nursing:
- *Zoe McCaleb, R. N., chief.

Division of industrial hygiene:
- *B. E. Neiswander, M. D., chief.
- E. R. Hayhurst, M. D., consultant.

Appropriations for 12 months ending December 31, 1929:

Personal services	$260,480
Maintenance	88,009
State aid for health districts	250,000
Total	598,489

Publications issued by health department:
- Ohio Health News (semimonthly).

OKLAHOMA

Executive health officer:
- *G. N. Bilby, M. D., State health commissioner, Oklahoma City.

Assistant State health commissioner:
- *J. P. Folan, Oklahoma City.

Bureau of vital statistics:
- *Juanita Johnston Smith, registrar.

Bureau of laboratories:
- *Katherine Harris, bacteriologist.

Bureau of maternity and infancy:
- *Mrs. I. L. Huff, director.

Bureau of rural sanitation:
- ——— ———

Bureau of sanitary engineering:
- *H. J. Darcey, director.

Bureau of public health education:
- *Pearl E. Wilson, R. N.

Bureau of epidemiology:
- *G. F. Mathews, M. D.

Appropriations for fiscal year ending June 30, 1932:

Administration—	
Commissioner	$4,800
Assistant commissioner	2,400
Secretary and stenographer	1,800
Bookkeeper	2,000
Stenographers (1 at $1,800, 1 at $1,500)	3,300
Bureau of public health education—	
Director	2,400
Stenographer	1,500
Bureau of diagnostic laboratory—	
Chemist	3,000
Assistant chemist	2,400
Bacteriologist	3,000
Assistant bacteriologist	2,400
Record clerk	1,800
Extra help—janitor	1,200
Manufacture vaccine	2,500
Bureau of sanitary engineering—	
Engineer	3,000
Bureau of pure food, drugs, and sanitary inspection—	
Supervisor (sanitary engineer)	2,400
Inspectors (6 at $1,800 each)	10,800
Bureau of vital statistics—	
Registrar	2,400
Assistant registrar	1,800
Statistical clerks (3 at $1,500 each)	4,500
Bureau of maternity and infancy—	
Director	3,000
Stenographer	1,500
Head nurse	2,400
Field nurses (4 at $1,800 each)	7,200
Extra help, etc	5,000
Printing, office supplies, and communications	4,500
Traveling expenses, including motor supplies and motor repairs	5,000
Travel, all departments	15,000
Communication	3,000
Printing	3,000
Office supplies	1,000
Medical supplies	9,000
Office equipment	500
Laboratory equipment	900
Special appropriations unallocated:	
Epidemiology, disease prevention	5,000
Rural sanitation and disease control in the rural districts and county health units	27,500
Malaria control	10,000
Total	162,900

OREGON

Board of health:
- J. H. Rosenberg, M. D., president, Prineville.
- H. H. Foskett, M. D., vice president, Portland.
- Frederick D. Stricker, M. D., secretary and State health officer, Portland.
- George E. Houck, M. D., Roseburg.
- N. E. Irvine, M. D., Lebanon.
- Albert Mount, M. D., Oregon City.
- J. P. Brennan, M. D , Pendleton.

Executive health officer:
- *Frederick D. Stricker, M. D., secretary and State health officer, Portland.

Registrar of vital statistics:
- *Frederick D. Stricker, M. D., Portland.

Division of child hygiene and public health nursing:
- *Minnette C. Twist, R. N., Portland.

Director of laboratory:
- *William Levin, D. P. H., Portland.

Appropriations for fiscal year ending December 31, 1931, $41,667.

Publications issued by health department:
- Annual report.
- Biennial report.
- Pamphlets and posters.
- Weekly letter.

PENNSYLVANIA

Department of health:
- Advisory health board—
  - Theodore B. Appel, M. D., chairman.
  - H. C. Frontz, M. D., Huntingdon.
  - J. M. Wainwright, M. D., Scranton.
  - S. R. Haythorn, M. D., Pittsburgh.
  - C. B. Auel, M. E., Pittsburgh.
  - Charles F. Mebus, C. E., Glenside.
- Sanitary water board—
  - Theodore B. Appel, M. D., chairman.
  - Lewis E. Staley, secretary of forests and waters, Bellefonte.
  - O. M. Diebler, commissioner of fisheries, Pleasant Mount.
  - P. T. Davis, Clearfield.
  - J. Norman Henry, M. D., Philadelphia.
  - Elmer A. Holbrook, Pittsburgh.
  - W. L. Stevenson, chief engineer and secretary, Harrisburg.
- Executive health officers—
  - *Theodore B. Appel, M. D., secretary of health, Harrisburg.
  - *J. Bruce McCreary, M. D., deputy secretary of health, Shippensburg.
- Sanatoria:
  - Mont Alto sanatorium—
    - *R. H. McCutcheon, M. D., medical director, South Mountain.
  - Cresson sanatorium—
    - *T. H. A. Stites, M. D., medical director, Cresson.
  - Hamburg sanatorium—
    - *Henry A. Gorman, M. D., medical director, Hamburg.
  - State hospital for crippled children—
    - *Francis S. Chambers, M. D.
    - *L. G. Owens, business manager, Elizabethtown.

Department of health—Continued.
- Bureau of communicable diseases—
  - *J. Moore Campbell, M. D., Harrisburg.
  - Section of Epidemiology—
    - *Harold B. Wood, M. D., Harrisburg.
    - *S. J. Dickey, M. D., Harrisburg.
  - Section of tuberculosis—
    - *John B. Critchfield, M. D., Lock Haven.
  - Genito-urinary section—
    - *Edgar S. Everhart, M. D., Lemoyne.
  - Section of restaurant hygiene—
    - *Howard M. Haines, Harrisburg.
- Bureau of sanitary engineering—
  - *W. L. Stevenson, C. E., chief engineer, Harrisburg.
  - Section of waterworks and sewerage—
    - *H. E. Moses, Harrisburg.
  - Section of rural water supplies and bottled water control—
    - *Henry P. Drake, Harrisburg.
  - Section of housing—
    - *H. F. Bronson, C. E., Harrisburg.
  - Section of nuisances—
    - *D. V. Ness, Harrisburg.
  - Section industrial waste—
    - *F. E. Daniels, Harrisburg.
- Bureau of milk control—
  - *Ralph E. Irwin, Camp Hill.
- Bureau of child health—school control—
  - *J. Bruce McCreary, M. D.
  - Field supervisor—
    - *C. W. Sheldon, M. D., Wellsboro.
  - Section of school health—
    - *John G. Ziegler, Lebanon.
  - Preschool section—
    - *Mary Riggs Noble, M. D., Harrisburg
  - Dental hygiene—
    - *C. J. Hollister, D. D. S., Harrisburg.
- Bureau of finance—
  - *Clinton T. Williams, Harrisburg.
  - Section of accounts—
    - *E. J. MacNamara, Philadelphia.
  - Section of supplies—
    - *Roy G. Miller, Harrisburg.
- Bureau of vital statistics—
  - *Emlyn Jones, M. D., Johnstown.
- Bureau of laboratories—
  - *John L. Laird, M. D., Philadelphia.
- Bureau of drug control—
  - *James N. Lightner, LL. B., Lancaster.
- Bureau of nursing—

- Bureau of inspection—
  - *Geo. A. Steims, York.
- Bureau of public health education—
  - *J. C. Funk, LL. B., Harrisburg.

Appropriations for biennial period ending May 31, 1933:

General health purposes and maintenance of sanatoria and hospital for crippled children	$5,400,000
Sanitary water board	225,000
Survey—Waters of Delaware River	50,000

Appropriations for biennial period ending May 31, 1933—Continued.
Sanatoria—Continued.

Construction for Mont Alto, Cresson, and Hamburg sanatoria and hospital for crippled children	$513,226
Anatomical board salaries and general expenses	33,800
Total	6,222,026

PHILIPPINE ISLANDS

Director of health:
Jacobo Fajardo, M. D., Manila.
Council of hygiene, advisory board to the director of health:
Gervasio Ocampo, M. D., Manila.
José, Albert, M. D., Manila.
Benito Valdes, M. D., Manila.
Eulogio P. Revilla, LL. B., Manila.
Executive officer:
*Jacobo Fajardo, M. D., director of health, Manila.
Assistant to the director:
*Regino G. Padua, M. D., Manila.
Office of records and finance:
*Mamerto Tianco, P. A., chief, Manila.
Office of property:
*Bonifacio Mencias, M. D., acting chief, Manila.
Office of vital statistics:
José Guidote, M. D., chief, Manila.
Office of general inspection:
*Rafael Villafranca, M. D., chief, Manila.
Public health education and publicity:
*José P. Bantug, M. D., chief, Manila.
Public health nursing:
*Genara S. Manongdo, R. N., chief, Manila.
Division of communicable diseases:
*Leoncio Lopez Rizal, M. D., chief, Manila.
Division of metropolitan sanitation:
*Eugenio Hernando, M. D., chief, Manila.
Division of hospitals, dispensaries, and laboratories:
*Eusebio D. Aguilar, M. D., chief, Manila.
Leprosy section—
*Sulpicio Chiyuto, M. D., chief, Manila.
Culion Leper Colony—
*Vicente Kiculf, M. D., chief.
Division of provincial sanitation:
*Gabriel Intengan, M. D., chief, Manila.
Division of malaria control:
*Cristobal Manalang, M. D., chief.
*Antonio Ejercito, M. D., assistant chief.
Division of sanitary engineering:
*Manuel Mañosa, C. E., chief, Manila.

Appropriations for fiscal year ending December 31, 1931:

Salaries and wages	$507,093.00
Miscellaneous expenses	981,187.00
Furniture and equipment	11,250.00
Total	1,499,530.00

Appropriations for fiscal year ending December 31, 1931—Continued.
Special expenses—

Continuation of treatment and diagnosis of lepers	$125,000.00
Maintenance of regional treatment stations, etc.	71,200.00
Aid to specially organized Provinces	278,050.00
Aid to the Province of Ilocos Sur for the operation, maintenance, and equipment of the Cervantes hospital	10,000.00
School of nursing in Baguio	5,250.00
Medicines, medical and surgical supplies for distribution to public school dispensaries	5,000.00
General demonstration on a small scale of the practical control of beriberi	5,000.00
Control of malaria in the regularly and specially organized Provinces and municipalities and municipal districts	37,000.00
For insular aid for operation and maintenance of provincial hospitals	153,392.00
Total for special expenses	689,892.00
Less required savings in any item of salaries and wages, miscellaneous expenses, furniture and equipment, and special expenses	39,680.50
Grand total of appropriations	2,149,741.50

Publications issued by the Philippine health service:
Daily Service News.
Weekly comparative epidemiological résumé.
Weekly résumé of births and deaths.
Monthly bulletin.
Annual report.
Service numbered pamphlets.
Reprints (unnumbered pamphlets).
Posters.

PORTO RICO

Department of health:
*A. Fernós Isern, M. D., commissioner of health, San Juan.
*Ramón J. Sifre, M. D., assistant commissioner, San Juan.
Insular board of health:
R. López Sicardo, M. D., chairman, San Juan.
W. A. Glines, M. D., San Juan.
Pablo Morales Otero, M. D., San Juan.
Ramón M. Suárez, M. D., San Juan.
Donald C. Cook, San Juan.
G. A. Ramírez de Arellano, San Juan.
A. Ortiz Toro, San Juan.
Luis B. de la Vega, M. D., secretary, San Juan.

Division of property and accounts:
*Abelardo Santiago, chief, San Juan.
Division of epidemiology:
*E. Garrido Morales, M. D., epidemiologist, San Juan.
Bureau of charities:
*Ramón Lavandero, M. D., chief, San Juan.
Bureau of general sanitary inspection:
*A. Bou de la Torre, M. D., chief, San Juan.
Bureau of sanitary engineering:
*Octavio Marcano, sanitary engineer, San Juan.
Bacteriological laboratory:
*Oscar Costa Mandry, M. D., director, San Juan.
Chemical laboratoty:
*R. del Valle Sárraga, Ph. C., director, San Juan.
Bureau of transmissible diseases:
*Abel de Juan, M. D., chief, San Juan.
Bureau of vital statistics:
*Manuel A. Pérez, chief, San Juan.
Bureau of tuberculosis:
*J. Rodríguez Pastor, M. D., chief, San Juan.
Central X-ray laboratory:
P. Gutiérrez Igaravidez, M. D., director, San Juan.
Division of social service:
*Consuelo Delgado, superintendent, San Juan.
Division: Care and prevention of venereal diseases:
Ernesto Quintero, M. D., specialist, San Juan.
Bureau of malaria:
*Walter C. Earle, M. D., chief, San Juan.
Bureau of rural sanitation:
*J. G. Bajandas, M. D., chief, San Juan.
Bureau of infant hygiene:
*Marta Robert de Romeu, M. D., chief, San Juan.
Bureau of public health units:
*Geo. C. Payne, M. D., chief, San Juan.
Appropriations for the fiscal year ending June 30, 1932:

Office of the commissioner of health	$120,902.44
Bureau of charities	504,567.50
Bureau of general sanitary inspection	55,280.00
Bureau of sanitary engineering	19,165.00
Bacteriological laboratory	39,875.00
Chemical laboratory	20,388.00
Bureau of transmissible diseases	83,870.00
Bureau of vital statistics	17,100.00
Bureau of tuberculosis	221,805.00
Division: Care and prevention of venereal diseases	11,400.00
Division of social service	6,700.00
Bureau of malaria	58,956.00
Bureau of rural sanitation	95,486.00
Bureau of infant hygiene	9,200.00
Public health units	252,620.00
Total	1,517,314.94

RHODE ISLAND

Public health commission:
Thomas J. McLaughlin, M. D., chairman, Woonsocket.
James H. Prior, M. D., Providence.
Berton W. Storrs, M. D., Portsmouth.
John Champlin, jr., M. D., Westerly.
Charles H. Holt, M. D., Pawtucket.
Executive health officer:
Lester A. Round, Ph. D., director of public health and State registrar, State Office Building, Providence.
Pathologist:
Lester A. Round, Ph. D., Providence.
Chemist:
Charles L. Poole, Providence.
Appropriations for fiscal year ending June 30, 1932:

Executive department	$50,280
Chemical laboratory	17,220
Pathological laboratory	31,063
Child welfare	24,800
Venereal diseases	8,545
Total	131,908

SOUTH CAROLINA

Executive committee, board of health:
William Egleston, M. D., chairman, Hartsville.
Robert Wilson, jr., M. D., Charleston.
L. D. Boone, M. D., Aiken.
Davis Furman, M. D., Greenville.
E. A. Hines, M. D., Seneca.
W. R. Wallace, M. D., Chester.
J. Lee Carpenter, Ph. G., Greenville.
F. M. Routh, M. D., Columbia.
George Dick, D. D. S., Sumter.
John M. Daniel, attorney general, Columbia.
A. J. Beattie, comptroller general, Columbia.
Executive health officer:
*James A. Hayne, M. D., State health officer, Columbia.
Department of county health units:
*Ben F. Wyman, M. D., director, Columbia.
Bureau of child hygiene:
*Nellie Cunningham, R. N., supervisor of public health nursing, Columbia.
Laboratory department:
*H. M. Smith, M. D., in charge, Columbia.
*J. R. Cain, chief bacteriologist, Columbia.
Bureau of vital statistics:
*C. W. Miller, chief clerk, Columbia.
Bacteriologist and chemist:
F. L. Parker, jr., M. D., Ph. D., Charleston.
South Carolina Sanitorium:
*Ernest Cooper, M. D., superintendent, Columbia.
Epidemiologist:
*A. H. Hayden, M. D., Columbia.

Sanitary engineer:
*A. E. Legare, C. E., Columbia.
Appropriations for fiscal year ending December 31, 1931:

Administrative office	$10,894.00
Control of epidemic diseases	47,722.00
Bureau of child hygiene	8,906 00
Bureau of vital statistics	8,153.00
Laboratory	12,708.00
Bureau of rural sanitation	56,298.50
Division of sanitary engineering	15,591.28
Tuberculosis sanatoria	173,634.00
Aid for crippled children	12,400.00
Total	346,306.78

Publications issued by health department:
Annual report.
Bulletins of various departments.

SOUTH DAKOTA

Board of health:
H. J. Barton, M. D., president, Watertown.
N. T. Owen, M. D., vice president, Rapid City.
A. C. Clark, M. D., Woonsocket.
H. R. Kenaston, M. D., Bonesteel.
P. B. Jenkins, M. D., superintendent, Waubay.
Executive health officer:
*Park B. Jenkins, M. D., superintendent, Waubay.
Division of vital statistics:
*Park B. Jenkins, M. D., Waubay.
Division of records and accounts:
*Edna Jenkins.
Division of medical licensure:
H. R. Kenaston, M. D.
Laboratories (at Vermilion):
J. C. Ohlmacher, M. D.
Division of child hygiene:
*Florence E. Walker, R. N.
Division of epidemiology:
*A. E. Bostrom, M. D.
Division of sanitary engineering:
*W. W. Towne, B. E.

Appropriations:

	1931-32	1932-33
Salaries and wages	$20,000	$20,000
Supplies and materials	2,500	2,500
Biological products	2,000	2,000
Postage, communication, and travel	4,000	4,000
Printing, binding, and advertising	2,500	2,500
Crippled children	2,500	2,500
Dues	50	50
Infancy and maternity work	7,000	7,000
Rent, light, and power	2,160	2,160
Total	42,710	42,710

TENNESSEE

Department of public health:
Central administration—
*E. L. Bishop, M. D., C. P. H., commissioner, Nashville.
County and other local health work—
*W. K. Sharp, jr., M. D., director, Nashville.
Child hygiene and public health nursing—
*H. S. Mustard, M. D., director, Nashville.
Miss M. G. Nisbet, supervising nurse, Nashville.
Health education—
*H. S. Mustard, M. D., director Nashville.
Dental hygiene—
*H. S. Mustard, M. D., director, Nashville.
Division of vital statistics—
*J. B. Bond, M. D., director, Nashville.
Division of preventable diseases—
*J. A. Crabtree, M. D., C. P. H., director, Nashville.
Tuberculosis control—
*R. S. Gass, M. D., director, Nashville.
Division of laboratories—
*Wm. Litterer, M. D., director, Nashville.
Division of sanitary engineering—
*Roy J. Morton, C. E., director, Nashville.
Appropriation for the fiscal period July 1, 1931, to June 30, 1932—

Central administration—	
Commissioner's office	$38,400
County and other local health work	285,150
Child hygiene and public health nursing	110,300
Health education	12,400
Dental hygiene	9,000
Division of vital statistics	35,200
Division of preventable diseases	57,000
Tuberculosis control	90,000
Division of laboratories	67,840
Division of sanitary engineering	44,100
Total	749,390

Other sources of revenue—

Rockefeller Foundation, International Health	27,480
Commonwealth fund	57,240
Rosenwald fund	32,940
National Tuberculosis Association	2,800
U. S. Public Health Service	109,020

TEXAS

Board of health:
A. A. Ross, M. D., president, Lockhart.
J. S. Wooten, M. D., Austin.
C. M. Rosser, M. D., Dallas.

Board of health—Continued.
E. W. Wright, M. D., Bowie.
Jno. W. Burns, M. D., Cuero.
J. M. Frazier, M. D., Belton.
J. C. Anderson, M. D., ex officio member of the board, and State health officer, Austin.
Ralph A. Ericson, D D. S., San Antonio.
J. M. Spoonts, Wichita Falls.
Executive health officer:
*J. C. Anderson, M. D., State health officer, Austin.
Bureau of child hygiene:
*H. N. Barnett, M. D., director.
Bureau of vital statistics:
*W. A. Davis, M. D., director.
Bureau of laboratories:
*S. W. Bohls, M. D., director.
Bureau of sanitary engineering:
*V. M. Ehlers, C. E., director.
Bureau of foods and drugs:
*E. G. Le May, Ph. G., director.
Appropriations for fiscal years 1931-1933,

per annum	$243, 300
Special malaria fund, per annum	25, 000
Special indexing fund (for one year only)	10, 000

UTAH

Board of health:
Joseph R. Morrell, M. D., president, Ogden.
T. B. Beatty, M. D., secretary, Salt Lake City.
Joseph H. Peck, M. D., Tooele.
John M. Wallace, Salt Lake City.
W. D. Donoher, M. D., Salt Lake City.
R. A. Hart, C. E., Salt Lake City.
Barnet E. Bonar, M. D., Salt Lake City.
Executive health officer:
*T. B. Beatty, M. D., State health commissioner, Salt Lake City.
Bureau of vital statistics:
*T. B. Beatty, M. D., State registrar.
*Anna M. Bowen, deputy registrar.
Bureau of child hygiene:
*T. B. Beatty, director.
Sanitary engineer:
*C. O. Pickel.
Bacteriological laboratory:
*E. H. Bramhall, bacteriologist.
Appropriations for two years ending June 30, 1933:

Salaries	$45, 108
Office expenses	8, 833
Travel	3, 299
Equipment	2, 000
Child hygiene (to match Federal funds)	13, 000
Total	72, 240

Publications issued by health department:
Quarterly bulletin.
Biennial report.

VERMONT

Board of health:
William G. Ricker, M. D., chairman, St. Johnsbury.
Edward J. Rogers, M. D., Pittsford.
John P. Gifford, M. D., Randolph.
Executive health officer:
*Charles F. Dalton, M. D., secretary, State board of health, Burlington.
Laboratory of hygiene:
*Charles F. Whitney, M. D., director, Burlington.
Sanitary engineering:
J. W. Votey, C. E., Burlington.
Sanitary inspector:
*Fred S. Kent, M. D., Burlington.
ivision of communicable diseases:
D*Fred S. Kent, M. D., Burlington.
Division of tuberculosis:
*H W. Slocum, Burlington.
Division of poliomyelitis:
*W. L. Aycock, M. D., research, Burlington.
*Lillian E. Kron, R. N., Burlington.
Division of maternal and infant hygiene:
*Nellie M. Jones, R. N., maternity, infancy, and child hygiene nurse.
Appropriations for fiscal year ending June 30, 1931:
Total budget, $47,000.
Other sources of revenue:
Private donations for study and treatment of infantile paralysis.
Publications issued by health department:
Biennial report.

VIRGIN ISLANDS

Executive health officer:
*R. B. Stafford, M. D., commissioner of health, Saint Thomas.

VIRGINIA

Board of health:
W. T. Graham, M. D., president, Richmond.
Mrs. W. M. Smith, Purcellville.
Frank Darling, Hampton.
J. A. McGuire, M. D., Norton.
Guy R. Harrison, D. D. S., Richmond.
George B. Lawson, M. D., Roanoke.
L. T. Royster, M. D., University.
Executive health officer:
*W. F. Draper, M. D., State health commissioner, Richmond.
*C. R. Keiley, Ph. D., executive assistant to commissioner; in charge of rural sanitation and publicity.
Registrar of vital statistics:
*W. A. Plecker, M. D., Richmond.
Epidemiologist:
*H. G. Grant, M. D., Richmond.
Bacteriologist:
*G. F. McGinnes, M. D., Richmond.
Sanitary engineer:
*Richard Messer, C. E., Richmond.
Bureau of child health:
*B. B. Bagby, M. D., director, Richmond.
Director of public health nursing:
*Nannit J. Minor, R. N., Richmond.
Director of mouth hygiene:
*N. Talley Ballou, D. D. S., Richmond.
Director tuberculosis out-patient service:
*Roy K. Flannagan, M. D., Richmond.
Appropriations for the fiscal year ending June 30, 1932:

Administration	$22, 580
Sanitary engineering	22, 085
Publicity	13, 450
Town sanitation	4, 500
Social hygiene	2, 500
Prevention of tuberculosis	65, 900
Control of epidemics	10, 975

Appropriations for the fiscal year ending June 30, 1932—Continued.

Laboratories	$24,340
Promotion of child health	57,380
Rural health work	95,000
Shellfish inspection and sanitation	25,000
Orthopedic treatment	25,000
Vital statistics	27,570
Collection and publication of marriage and divorce statistics	4,005
Prevention of blindness	2,360
Tuberculosis sanatoria	330,130
Total	732,775

Publications issued by health department:
- Monthly bulletin.
- Annual report.

WASHINGTON

Board of health:
- A. E. Stuht, M. D., director of health, chairman.
- Clarence A. Smith, M. D., Seattle.
- James H. Egan, M. D., Tacoma.
- Samuel L. Caldbick, M. D., Everett.
- John O'Shea, M. D., Spokane.
- H. W. Nightingale, secretary, Seattle.

Executive health officer:
- *A. E. Stuht, M. D., State director of health, Seattle.

Epidemiologist:
- *A. U. Simpson, M. D., Seattle.

Chief of laboratory:
- *A. U. Simpson, M. D., Seattle.

Sanitary engineer:
- *H. W. Nightingale, C. E., Seattle.

Registrar:
- *H. W. Nightingale, C. E., Seattle.

Division of public health nursing:
- *Mary Louise Allen, chief.

Appropriation for two years ending March 31, 1933:

General fund—	
Salaries and wages	$50,250
Operations	23,050
For maternal and child hygiene	8,000
From fisheries fund—	
Salaries and wages	10,000
Operations	5,000
Tuberculosis hospitals—	
State aid to local sanatoria	340,000

WEST VIRGINIA

Public health council:
- B. O. Robinson, M. D., president, Parkersburg.
- H. A. Barbee, M. D., Point Pleasant.
- W. S. Fulton, M. D., Wheeling.
- W. E. Neal, M. D., Huntington.
- A. H. Hoge, M. D., Bluefield.
- R. H. Walker, M. D., Charleston.
- W. T. Henshaw, M. D., commissioner of health, Charleston.

Executive health officer:
- *W. T. Henshaw, M. D., commissioner of health, Charleston.

Division of sanitary engineering:
- *Ellis S. Tisdale, chief engineer, Charleston.
- *John B. Harrington, assistant engineer, Charleston.
- *H. K. Gidley, assistant engineer, Charleston.

Division of vital statistics:
- *Carl F. Raver, M. D., M. P. H., Charleston.

Division of child hygiene:
- *R. H. Paden, M. D., M. P. H., director, Charleston.
- *Edna M. Hardsaw, field advisory nurse, Charleston.

Division of preventable diseases:
- *W. T. Henshaw, M. D., acting director, Charleston.

Bureau of venereal diseases:
- *David Littlejohn, A. A. surgeon, U. S. P. H. S., director, Charleston.
- *Ada C. McDermott, associate director, Charleston.

Division of rural sanitation:
- *David Littlejohn, A. A. surgeon, U. S. P. H. S., director, Charleston.

Hygienic laboratory:
- *Elizabeth I. Parsons, director, Charleston.
- *Margaret K. Riffe, laboratory technician, Charleston.
- *J. Roy Monroe, technician, Charleston.
- *Mark C. Harp, technician, Charleston.
- *Dorothy C. Kuykendall, technician, Charleston.

Bureau of public health education:
- *Dorothea Campbell, director, Charleston.

Appropriations for fiscal year ending June 30, 1932:

For general use	$110,000
Salary of commissioner	4,800
Total	114,800

Other sources of revenue:
- Expenses of cooperative work with the Federal Government.
- Expenses of cooperative rural health work with the Rockefeller Foundation.

Publications issued by health department:
- Quarterly bulletin.
- Annual report.

WISCONSIN

Board of health:
- G. Windesheim, M. D., president, Kenosha.
- Joseph Dean, M. D., vice president, Madison.
- J. J. Seelman, M. D., Milwaukee.
- Mina B. Glasier, M. D., Bloomington.
- Stephen Cahana, M. D., Milwaukee.
- H. H. Ainsworth, M. D., Birchwood.
- C. A. Harper, M. D., State health officer, Madison.

Executive health officer:
- *C. A. Harper, M. D., State health officer, Madison.

Assistant State health officer:
- *G. W. Henika, M. D., Madison.

Deputy State health officers:
- *W. J. Miller, M. D., Madison.
- *G. E. Hoyt, M. D., Milwaukee.
- *V. A. Gudex, M. D., Oshkosh.
- *F. P. Daly, M. D., Eau Claire.
- *R. L. Frisbie, M. D., Rhinelander.

Bureau of vital statistics:
- *C. A. Harper, M. D., State registrar, Madison.
- *L. W. Hutchcroft, statistician, Madison.

Bureau of communicable diseases:
- *H. M. Guilford, M. D., director, Madison.

Bureau of sanitary engineering:
- *L. F. Warrick, State sanitary engineer, Madison.
- *O. J. Muegge, assistant sanitary engineer, Madison.
- *E. J. Beatty, assistant sanitary engineer, Madison.
- *J. M. Holderby, assistant sanitary engineer, Madison.
- *E. J. Tully, chemical engineer, Madison.

Bureau of education:
- *John Culnan, acting director, Madison.

Bureau of child welfare:
- *Charlotte Calvert, M. D., acting director, Madison.
- *Eleanor Hutchinson, M. D., child-health physician, Madison.
- *Margaret Nelson, M. D., child-health physician, Madison.
- *Elizabeth Taylor, M. D., child-health physician.
- *Helen Thayer, organizer of infant hygiene courses, Madison.

Bureau of public-health nursing:
- *Cornelia Van Kooy, R. N., director, Madison.
- *Edith L. Olson, R. N., field advisory nurse, Madison.
- *Ada Newman, R. N., field advisory nurse, Madison.
- *Martha Jenny, R. N., field advisory nurse, Madison.

Bureau of nursing education:
- *Adda Eldredge, R. N., director, Madison.

Bureau of plumbing and domestic sanitary engineering:
- *Frank R. King, State domestic sanitary engineer, Madison.

Bureau of social hygiene:
- *H. M. Guilford, M. D., director, Madison.
- *Aimee Zillmer, lecturer, Madison.
- *D. M. Warner, lecturer, Madison.

Laboratory service:
- *W. D. Stovall, M. D., director, State laboratories, Madison.
- *M. S. Nichols, chemist, State laboratory, Madison.
- *Anna Brandsmark, director, branch laboratory, Rhinelander.
- *Mildred Englebert, director, cooperative laboratory, Beloit.

Laboratory service—Continued.
- *Marjorie Bates, director, cooperative laboratory, Oshkosh.
- *Henry Miller, director, cooperative laboratory, Kenosha.
- *Josephine Foote, director, cooperative laboratory, Wausau.
- *Martha Thompson, director, cooperative laboratory, Superior.
- *Clarissa McFetridge, director, cooperative laboratory, Green Bay.

Appropriations for fiscal year ending June 30, 1930:

General administration	$164,570
Licensing—	
Embalmers	6,364
Hotels and restaurants	32,846
Barbers	19,228
Plumbers	19,214
Beauty parlors	18,387
Nurses	19,806
(All monies received as license fees revert directly to the State general fund and the above amounts are appropriated for the various departments' use in each field.)	
Bureau of child welfare and public health nursing	51,000
Enforcement of medical practices act	5,000
Total	336,415

Publications issued by health department:
- Quarterly bulletin.
- Biennial report.

WYOMING

Board of health:
- Albert B. Tonkin, M. D., president, Riverton.
- B.V.McDermott, M. D., vice president, Hanna.
- William H. Roberts, M. D., Sheridan.
- W. H. Hassed, M. D., secretary and executive officer, Cheyenne.
- Galen A. Fox, M. D., Cheyenne.

Executive health officer:
- *W. H. Hassed, M. D., State health officer, Cheyenne.

Appropriations for biennial period ending Mar. 31, 1933:

State board of health	$11,000
Salary of secretary	8,000
Maternal and infant welfare	7,500
Bureau of vital statistics	3,500
Total	30,000

CITY HEALTH OFFICERS, 1931

Directory of Those in Cities of 10,000 or More Population

Directories of the city health officers in the cities of the United States having a population of 10,000 or more have been published in the Public Health Reports [1] for each year from 1916 to 1930 for the information of health officers and others interested in public-health activities. These directories have been compiled from data furnished by the health officers. The cities included in this directory

[1] Reprints Nos. 346, 416, 494, 539, 599, 702, 767, 876, 930, 1025, 1103, 1177, 1257, 1333, and 1426 from the PUBLIC HEALTH REPORTS.

are those having populations of 10,000 or more according to the 1930 census.

The asterisk (*) indicates that the officer before whose name it appears has been reported to be a "whole-time" health officer. For this purpose a "whole-time" officer is defined as "one who does not engage in the practice of medicine or in any other business, but devotes all his time to official duties."

City	Name of health officer	Official title
Alabama:		
Anniston		
Bessemer	*Robert V. Hazlewood, D. V. M.	Director of sanitation.
Birmingham	*J. D. Dowling, M. D.	County and city health officer.
Decatur	*H. C. McRee, M. D.	County health officer.
Dothan	*F. G. Granger, M. D.	Do.
Fairfield		
Florence	*W. D. Hubbard, M. D.	City and county health officer.
Gadsden	*C. L. Murphree, M. D.	Do.
Huntsville	*W. C. Hatchett, M. D.	County health officer.
Mobile	*Charles A. Mohr, M. D.	Do.
Montgomery	*James L. Bowman, M. D.	Do.
Phenix	Seth J. Floyd, M. D.	City physician.
Selma	*L. T. Lee, M. D.	City and county health officer.
Tuscaloosa	*A. A. Kirk, M. D.	Do.
Arizona:		
Phoenix	Harry J. Felch, M. D.	City health officer.
Tuscon	*Lewis H. Howard, M. D.	Director Pima County health unit.
Arkansas:		
Blytheville	Isaac R. Johnson, M. D.	City health officer.
El Dorado	Fergus O. Mahony, M. D.	Do.
Fort Smith	*J. E. Johnson, M. D.	Field agent, United States Public Health Service.
Hot Springs	*James F. Merritt, M. D.	Medical director.
Jonesboro	Ralph M. Sloan, M. D.	City health officer.
Little Rock	C. R. Moon, M. D.	Do.
North Little Rock	James A. Summers, M. D.	Health officer.
Pine Bluff	*George A. Hays, M. D.	County medical director.
Texarkana	Harry E. Murry, M. D.	City physician.
California:		
Alameda	Ralph W. Sanders, M. D.	Health officer and city physician.
Alhambra	*S. J. Stewart, M. D.	District health officer.
Anaheim	*Kenneth H. Sutherland, M. D.	County health officer.
Bakersfield	P. J. Cuneo, LL. B., M. D.	City health officer.
Berkeley	*Frank L. Kelly, M. D., Dr. P. H.	Health officer.
Beverly Hills	Charles F. Nelson, M. D.	Do.
Brawley	John L. Parker, M. D.	Do.
Burbank	T. H. Ransom, M. D.	Do.
Burlingame	Matthew F. Desmond, M. D.	Burlingame health officer.
Compton	*J. L. Pomeroy, M. D.	County health officer.
Eureka	W. J. Quinn, M. D.	Health officer and city physician.
Fresno	C. Mathewson, M. D.	City health officer.
Fullerton	*K. H. Sutherland, M. D.	County health officer.
Glendale	*D. E. Smallhorst, M. D.	District health officer.
Huntington Park	*George M. Malkin, M. D.	Do.
Inglewood	*Henry C. Smiley, M. D.	Do.
Long Beach	*G. E. McDonald, M. D.	City health officer.
Los Angeles	*George Parrish, M. D.	Health officer.
	*George M. Stevens, M. D.	Epidemiologist and first assistant health officer.
	Divisional directors:	
	*G. F. Schmelzel, M. D.	Medical director.
	*Harry Cohn, M. D.	Director of tuberculosis.
	*Agnes M. Talcott	Director of nurses.
	*C. B. Leasure	Chief clerk.
	*F. W. Peterson	Director of vital statistics.
	*John Carman	Chief chemist.
	*Mona Bettin, M. D.	Chief bacteriologist.
	*F. D. Sweger	Director of housing and sanitation.
	*William Veit, D. V. M.	Director of milk and meat inspection.
	*H. H. Matthieson	Sanitary engineer.
	*A. M. Rogers, M. D.	Director, venereal clinic (male).
	*Emily F. Balcom, M. D.	Director, venereal clinic (female).
	*Lyle McNeile, M. D.	Director, maternity and child hygiene division.
	*C. K. Stewart	Director of rodent division.
	*J. M. Cain	Director of quarantine and morbidity divisions.
Modesto	Harold Powers Muller, M. D.	City health officer.

City	Name of health officer	Official title
California—Continued.		
Monrovia	*J. M. Furstman, M. D	District health officer.
Oakland	Mark L. Emerson, M. D	Health officer and city physician.
Ontario	Calvert L. Emmons, M. D	Health officer.
Palo Alto	*Louis Olsen, S. E	Do.
Pasadena	*J. D. Dunshee, M. D	Do.
Pomona	*Eugene F. Fontaine, M. D	District health officer.
Redlands	Harold G. Gentry, M. D	Secretary, board of health.
Richmond	Charles Robert Blake, M. D	Commissioner of health.
Riverside	*William B. Wells, M. D	Do.
Sacramento	*Herbert F. True, M. D	City health officer and registrar.
Salinas	*Miss Marie K. Fidel, P. H. N	City health officer.
San Bernardino	W. W. Fenton, M. D	Do.
San Buenaventura		
San Diego	*Alex. M. Lesem, M. D	Health officer.
San Francisco	*Jacques P. Gray, M. D	Acting health officer and local registrar.
Division of sanitation (includes epidemiological and disinfection).	*Jacques P. Gray, M. D	Epidemiologist.
Dairy, milk, and food division (includes industrial division).	Thomas P. Lydon	Chief of division.
Meat and market division	Carl G. Hansen	Do.
Housing division	Homer P. Thyle	Do.
Plumbing division	William D. Hobro	Do.
Child-welfare division (includes social service).	Eleanor Stockton, P. H. N	Director, field nursing.
School-health division	*Paul S. Barrett, M. D	Acting director of child hygiene.
Dental division	Robert Grosso, D. D. S	Chief dentist.
Psychological division	Olga Bridgman, M. D	Psychologist.
Chest clinic division (tuberculosis).	W. R. P. Clark, M. D	Director.
Social-hygiene division	R. W. Burlingame, M. D	Chief clinician.
Bacteriological division	Anna D. MacRae, M. D	Director.
Chemical laboratory	Clinton Davis	Chief chemist.
Auditing division	Percy R. Hennessy	Auditor.
San Francisco Hospital	Leon M. Wilbor, M. D	Superintendent.
Laguna Honda Home	Charles M. Wollenberg	Do.
Emergency service	Edmund Butler, M. D	Chief surgeon.
San Jose	*Henry C. Brown, M. D	Health officer.
San Leandro	L. Michael, M. D	City health officer.
San Mateo	*W. C. McLean, D. V. M	Health officer and dairy inspector.
Santa Ana	*K. H. Sutherland, M. D	County health officer.
Santa Barbara	*William H. Eaton, M. D	Health officer.
Santa Cruz	John T. Harrington, M. D	City health officer.
Santa Monica	*Wm. F. Reasner, M. D	District health officer.
Santa Rosa	*E. J. Helgren, B. S. Chem	Health officer and milk inspector.
South Gate	*George M. Malkin, M. D	District health officer.
South Pasadena	E. J. Johnston, M. D	Health officer.
Stockton	*John J. Sippy, M. D	District health officer.
Vallejo	E. A. Peterson, M. D	City health officer.
Whittier	*F. G. Crandall, M. D	District health officer.
Colorado:		
Boulder	Carl H. Graf, M. D	City health officer.
Colorado Springs	O. R. Gillett, M. D	Do.
Denver	*Fred W. Bailey	Manager of health and charity.
Fort Collins	T. C. Taylor, M. D	Health officer.
Grand Junction	E. H. Munro, M. D	City physician.
Greeley	O. E. Benell, M. D	City health officer.
Pueblo	*W. E. Buck, M. D	Chief, department of health.
Trinidad	Charles O. McClure, M. D	City physician.
Connecticut:		
Ansonia	William H. O'Neil, M. D	Health officer.
Bridgeport	*William F. Wild, C. P. H., M. D	Do.
Bristol	B. B. Robbins, M. D	City health officer.
Danbury	E. J. S. Scofield, M. D	Health officer.
Derby	Thomas F. Plunkett, M. D	Do.
East Hartford	Francis Wellington Brecker, M. D.	Do.
Enfield	Frank F. Simonton, M. D	Do.
Fairfield	*Lawrence E. Poole, M. D., Dr. P. H.	Health officer and school physician.
Groton	Frank W. Hewes, M. D	Borough health officer.
Hamden	George H. Joslin, M. D	Superintendent of health.
Hartford	*Charles Porter Botsford, M. D	Superintendent, board of health, and registrar.
Manchester	D. C. Y. Moore, M. D	Chairman, board of health.
Meriden	Joseph A. Cooke, M. D	Health officer.
Middletown	John H. Mountain, D. D. S., M. D.	Do.
Milford		
Naugatuck		
New Britain	*Louis J. Dumont, M. D	Superintendent of health.

City	Name of health officer	Official title
Connecticut—Continued.		
New Haven	*John L Rice, M. D.	Health officer.
New London	*Benjamin N. Pennell, D. V. S.	Do.
Norwalk		
Norwich	Harrison Gray, M. D.	City and town health officer.
Shelton		
Stamford	*Raymond D Fear, M. D., Dr. P. H.	Health commissioner.
Stonington	D. Edward Taylor, M. D.	Health officer.
Stratford	De Ruyter Howland, M. D	Town health officer.
Torrington		
Wallingford		
Waterbury	*Edward J Godfrey, M. D.	City health officer.
West Hartford	L. A Cushman, M. D.	Health officer.
West Haven	*C. A. Bevan, M. D.	Do.
Willimantic	Nathan Spector, M. D.	City health officer.
Delaware:		
Wilmington		
District of Columbia:		
Washington	*William C. Fowler, M. D.	Health officer.
	*Edward J. Schwartz, M. D.	Assistant health officer.
	*Arthur G. Cole	Chief clerk and deputy health officer.
Bureau of preventable diseases.	*James G. Cumming, M. D.	Director.
Medical inspection of schools.	*Joseph A. Murphy, M. D.	Do.
Food inspection	*Reid R. Ashworth, D. V. S.	Do.
Sanitary inspection	*J. Frank Butts, LL. B.	Do.
Vital statistics	*John H. Milligan	Do.
Chemical laboratory	*John B. Reed	Do.
Bacteriological laboratory	*John E. Noble	Do.
Serological laboratory	*Jesse P. Porch, D. V. M.	Do.
Microanalytical laboratory.	*Edwin R. Donaldson	Do.
Child welfare and hygiene service.	*Hugh J. Davis, M. D.	Do.
Pound	*Walter R. Smith	Poundmaster.
Florida:		
Daytona Beach	*Peter Garside, M. D. C.	City health officer and milk inspector.
Gainesville		
Jacksonville	*N. A. Upchurch, M. D.	Health officer.
Key West	H. C. Galey, M. D.	City health officer.
Lakeland	George C. Overstreet, M. D.	City physician and health officer.
Miami	*George N. MacDonell, M. D.	Chief, division of health.
Orlando	Sylvan McElroy, M. D.	City health officer.
Pensacola	William D. Nobles, M. D.	City health officer and physician.
St. Augustine	Herbert E. White, M. D.	City health officer.
St. Petersburg	*W. W. Hardon, M. D.	Health officer and city physician.
Sanford	J. N. Tolar, M. D.	Health officer.
Tallahassee	*L. J. Graves, M. D.	Director, county health unit.
Tampa	*J. R. McEachern, M. D.	City health officer.
West Palm Beach	W. E. Van Landingham, M. D.	City health officer and city physician.
Georgia:		
Albany	*Hugo Robinson, M. D.	County commissioner of health.
Athens	*Thomas H. Johnston, M. D., Dr. P. H.	Health commissioner.
Atlanta	*John Payson Kennedy, M. D.	City health officer.
Augusta	Eugene E. Murphey, M. D.	Health officer.
Brunswick	*H. L. Akridge, M. D., D. P. H.	Commissioner of health.
Columbus		
Decatur	H. Homer Allen, M. D.	City health officer.
Griffin	*William C. Humphries, M. D.	Commissioner of health.
Lagrange		
Macon	*J. D. Applewhite, M. D.	Health officer.
Rome	*B. V. Elmore, M. D.	Commissioner of health.
Savannah	*Victor H. Bassett, M. D.	City health officer.
Thomasville	*H. B. Jenkins, M. D., M. S. P. H.	County health commissioner.
Valdosta	*Gordon T. Crozier, M. D., Dr. P. H.	City health officer.
Waycross	*George E. Atwood, M. D., Dr. P. H.	Commissioner of health.
Idaho:		
Boise	*W. H. Rhodes	Health officer.
Pocatello		
Illinois:		
Alton	A. P. Robertson, M. D.	Health commissioner.
Aurora	George W. Haan, M. D.	Health commissioner and registrar.
Belleville	B. H. Portuondo, M. D.	Public health officer.
Berwyn	*P. E. Wright, M. D.	Health director.
Bloomington		
Blue Island	*L. A. Burkhart	Commissioner of health.
Brookfield	Walter E. Baus	Health officer.
Cairo	C. L. Weber, M. D.	Do.

City	Name of health officer	Official title
Illinois—Continued.		
Calumet	*E. S. O'Brien, M. D., Dr. P. H.	Health commissioner.
Canton	C. J. Johnston, M. D	President, board of health.
Centralia	H. E. Wilson, M. D	Health officer.
Champaign	C. George Appelle, M. D	City health officer.
Chicago	*Herman N. Bundesen, M. D	Commissioner of health.
	H. O. Jones, M. D	Assistant health commissioner.
Bureau of communicable diseases.	Isaac D. Rawlings, M. D	Chief of bureau.
Bureau of child welfare	Henry C. Niblack, M. D	Do.
Bureau of dental hygiene	Lon W. Morrey, D. D. S	Do.
Bureau of laboratories and research.	F. O. Tonney, M. D	Do.
Bureau of hospitals	Archibald L. Hoyne, M. D	Do.
Bureau of sanitary engineering.	Joel I. Connolly	Do.
Bureau of vital statistics	M. O. Heckard, M. D	Do.
Bureau of dairy products	Henry C. Becker, M. D. V	Do.
Bureau of food inspection	J. P. Kilcourse	Do.
Bureau of inspection service.	William H. Riley	Acting chief of bureau.
Chicago Heights	A. H. Pannenborg, M. D	Commissioner of health.
Cicero	J. J. Hood, M. D	Health commissioner.
Danville	Elmer B. Cooley, M. D	Do.
Decatur	*Charles Raimer Smith, M. D	Director of public health.
East Moline	J. Henry Fowler, M. D	Health officer.
East St. Louis	*Albert P. Lauman	Health commissioner.
Elgin	*A. L. Mann, M. D	Executive officer.
Elmhurst	T. Franklin James M. D	Commissioner of health.
Elmwood Park	*Mrs. Laura Arney	Do.
Evanston	*John W. H. Pollard, M. D	Do.
Forest Park		
Freeport	James A. Poling, M. D	Health commissioner.
Galesburg	E. D. Wing, M. D	Do.
Granite City	L. D. Darner, M. D	Do.
Harrisburg	Charles Walden, M. D	Health officer.
Harvey	M. R. R. Morse, M. D	Do.
Highland Park		
Jacksonville	J. H. Spencer, M. D	Do.
Joliet	Lloyd B. Andrew, M. D	Health commissioner.
Kankakee	*C. K. Smith, M. D	Health officer.
Kewanee	H. N. Heflin, M. D	Commissioner of health.
La Grange	J. W. Carr, M. D	Health officer.
La Salle	*Arlington Ailes, M. D., C. P. H.	Health commissioner.
Lincoln	*Willard A. Comstock	Health officer.
Mattoon	J. G. Baker, M. D	Health commissioner.
Maywood	R. L. Reynolds, M. D	Do.
Melrose Park	P. B. Klonka, M. D	Do.
Moline	E. A. Edlen, M. D	City physician.
Mount Vernon		
Oak Park	Frank S. Needham, M. D	Commissioner of health.
Ottawa	E. P. Hatheway, M. D	Health officer.
Park Ridge	R. F. Olmstead, M. D	City physician.
Pekin	Nelson A. Wright, jr., M. D	City health officer.
Peoria	*E. S. Gillespie, M. D	Commissioner of health.
Quincy	*H. O. Collins, M. D	Public health officer.
Rock Island	Ralph Dart, M. D	Commissioner of health.
Rockford	*N. O. Gunderson, M. D	Do.
Springfield	C. W. Milligan, M. D	Superintendent of health.
Sterling	Walter L. Carolus, M. D	Health officer.
Streator	Theresa Jennings, M. D	President, board of health.
Urbana	*George F. Way, M. D	Health officer.
Waukegan	John D. Foley, M. D	Health commissioner.
West Frankfort		
Wilmette	W. W. Hawkins, M. D	Health commissioner.
Winnetka	*H. A. Orvis, M. D	Health officer.
Indiana:		
Anderson	E. M. Conrad, M. D	Secretary, board of health.
Bedford	*Charles Blackburn	Health commissioner.
Bloomington	Russell A. DeMotte, M. D	Secretary, board of health.
Connersville	H. W. Smelser, M. D	Health officer.
Crawfordsville	Fred N. Dougherty, M. D	Secretary, board of health.
East Chicago	Frank Henry Mervis, Ph. G., M. D.	Do.
Elkhart	Ivan J. Markel, M. D	Do.
Elwood	Thomas S. Owen, M. D	City health officer.
Evansville	L. E. Fritsch, M. D	Secretary, board of health.
Fort Wayne	Carl G. Miller, M. D	Health commissioner.
Frankfort	C. A. Zinn, M. D	Secretary, board of health.
Gary	Walter M. Behn, M. D	Do.
Goshen	G. A. Whippy, M. D	City health officer.
Hammond	J. A. Chevigny, M. D	Health commissioner.
Huntington		
Indianapolis	*H. G. Morgan, M. D	Do.
Jeffersonville	Samuel L. Adair, M. D	Health officer.

City	Name of health officer	Official title
Indiana—Continued.		
Kokomo	T. C. Cochran, M. D	Secretary, board of health.
La Fayette	M. M. Lairy, M. D	Do.
La Porte	Jon Nelson Kelly, M. D	Health officer
Logansport	*Louis P. Denner	Health inspector
Marion	L. H. Eshleman, M. D	Secretary, board of health.
Michigan City	Nelle C. Reed, M. D	Do.
Mishawaka	M. D. Wygant, M. D	Do.
Muncie	John H. Williams, M. D	Do
New Albany	Anna I. McKamy, Ph. B., M. D	Do.
Newcastle	Walter Moses Stout, M. D	Do.
Peru	W. H. Wagoner, M. D	Do.
Richmond	M. F. Johnston, M. D	Do.
Shelbyville	Walter C. McFadden, M. D	Do.
South Bend	John B. Berteling, M. D	Do.
Terre Haute	John E. Dailey, M. D	Do.
Vincennes	Robert G. Moore, M. D	Do.
Whiting	Bryce B. Reeve, M. D	Do.
Iowa:		
Ames	C. A. Aplin, M. D	Health officer.
Boone	Wm. Woodburn, M. D	Do.
Burlington	*Carl F. Jordan, M. D., C. P. H	Medical director, county health unit.
Cedar Rapids	B. G. Broghammer, M. D	Health officer and city physician.
Clinton	Frank A. Hohenschuh, M. D	Do.
Council Bluffs	D. O. Hankey, M. D	City health officer.
Davenport	*E. O. Ficke, M. D	Director
Des Moines	*Harley L. Sayler, M. D	Health commissioner.
Dubuque	W. J. Connell, M. D., M. P. H	Director of health.
Fort Dodge	*E. S. Welch	Sanitary police.
Fort Madison		
Iowa City		
Keokuk	John H. Wilson, M. D	Physician, board of health.
Marshalltown	M. U. Chesire, M. D	Health officer.
Mason City	C. E. Dakin, M. D	Director of health and sanitation.
Muscatine	Rodney M. Arey, M. D	City health physician.
Newton	Sylvester E Hinshaw, M. D	Health officer.
Oskaloosa	Edward Marsh Williams, M. D	Health officer and city bacteriologist.
Ottumwa		
Sioux City	*W. S. Petty, M. D	Director, county health unit, field agent, U. S. Public Health Service.
Waterloo	Joseph E. Ridenour, M. D	Health officer.
Kansas:		
Arkansas City	B. C. Geeslin, M. D	Chairman, board of health.
Atchison	Chas. W. Robinson, M. D	City and county health officer.
Chanute	James A. Butin, M. D	City health officer.
Coffeyville	A. Boese, M. D	City physician and health officer.
Dodge City	C. L. Hooper, M. D	City physician.
Eldorado	*Tom A. Jackson	Food, drug, dairy, and sanitary inspector.
Emporia	*J. S. Fulton, M. D	Field agent, U. S. Public Health Service.
Fort Scott	C. L. Mosley, M. D	City health officer.
Hutchison	Guy R. Walker, M. D	City physician.
Independence	Stephen Flatt, M. D	Health officer.
Kansas City	*Schubert David Henry, M. D	Director of health.
Lawrence	E. R. Keith, M. D	City health officer.
Leavenworth	A. L. Suwalsky, M. D	City physician.
Manhattan	J. R. Mathews, M. D	County health officer.
Newton	F. G. Bartlet, M. D	Do.
Parsons	M. C. Ruble, M. D	City physician and health officer.
Pittsburg	C. Mart Montee, M. D	City health officer.
Salina	S. T. Blades, M. D	Health officer.
Topeka	*Aurel Goodwin, M. D	City health officer.
Wichita	*R. E. Hobbs, M. D	Director of public welfare.
Kentucky:		
Ashland	*Robert D. Higgins, M.D	Director of health, Field agent, U. S. Public Health Service.
Bowling Green	*B. S. Rutherford, M.D	Health officer.
Covington	James P. Riffe, M. D	Do.
Fort Thomas	Frank H. Southgate, M. D	Do.
Frankfort	C. T. Coleman, M. D	City health officer.
Henderson	*Robert L. Galloway, M. D., M. P. H.	County health officer.
Hopkinsville	Philip E. Haynes, M. D	City health officer.
Lexington	*Charles H. Voorhies, M. D	Health officer.
Louisville	*Clarence H. Harris, M. D	Director of health.
Middlesboro	*Millard D. Hoskins, M. D	County health officer.
Newport	John Todd, M.D	City health officer.
Owensboro	*Geo. L. Thompson, M. D	Director of health.
Paducah	E. B. Willingham, M. D	Acting health officer.
Louisiana:		
Alexandria	J. A. Packer, M. D	President, board of health.
Baton Rouge	T. Jeff. McHugh, M. D	City health officer.
Bogalusa	J. H. Slaughter, M. D	Do.
Lafayette	Milton R. Cushman, M. D	Health officer.

City	Name of health officer	Official title
Louisiana—Continued.		
Lake Charles	H. B. White, M. D	President, board of health.
Monroe	D. I. Hirsch, M. D	City health officer.
New Orleans	*William H. Robin, M. D	Superintendent of public health.
Shreveport	*J. H. Cannon, M. D	President, city board of health.
Maine:		
Auburn	E. Leathers, M. D	City health officer.
Augusta	George A. Coombs, M. D	Health officer.
Bangor	*H. D. McNeil, M. D	Local health officer.
Bath	H. B. Duce, D. O	City health officer.
Biddeford	*John W. Mahoney	Local health officer.
Lewiston	*Robert J. Wiseman, jr., M. D	Health officer.
Portland	*Thomas Tetreau, M. D	City health officer.
Rumford	*Thomas Stone Burr, M. D	Local health officer.
Sanford	*W. H. Kelly, M. D	Health officer.
South Portland	Waldo T. Skillin, M. D	Do.
Waterville	*Arthur R Daviau, M. D	Do.
Westbrook	Patrick H. Welch	Local health officer.
Maryland:		
Annapolis	Joseph C. Joyce, M. D	Health officer.
Baltimore	*C. Hampson Jones, M. D	Commissioner of health and registrar of vital statistics.
	*J. Frederick Hempel, M. D	Assistant commissioner of health.
	*V. L. Ellicott, M. D	Epidemiologist.
Bureau of bacteriology	*C. Leroy Ewing	Director.
Bureau of chemistry and food.	*R. S. Craig	Do.
Bureau of meat inspection	*William Brenner, D. V. S	Do.
Bureau of communicable diseases.	*Ferdinand O. Reinhard, M. D	Do.
Bureau of sanitation	*George J. Fitch	Do.
Bureau of nursing	*Mrs. J. B. Laib	Do.
Bureau of child welfare	*William H. F. Warthen, M. D	Do.
Bureau of vital statistics	*Howard A. Moore	Chief.
Bureau of hospitals	*Myron G. Tull, M. D	Director.
Cumberland	*Harvey H. Weiss	Health officer and registrar of vital statistics.
Frederick	*E. C. Kefauver, M. D	City and county health officer.
Hagerstown	*W. R. Cameron, M. D	Do.
Salisbury	*Seth H. Hurdle, M. D	Deputy State health officer.
Massachusetts:		
Adams	Katherine M. Gavin	Clerk, board of health.
Amesbury	Clarence S. Morse	Agent, board of health.
Arlington	*William H. Bradley	Do.
Athol	Marion B. Sibley, M. D	Secretary, board of health.
Attleboro	William O. Hewitt, M. D	Health officer.
Belmont	*Thomas F. Harris	Do.
Beverly	*Alonzo O. Woodbury	Agent, board of health.
Boston	*Francis X. Mahoney, D. V. M., M. D.	Health commissioner.
Divisions—		
Medical	*M. Victor Safford, M. D	Deputy commissioner.
Communicable diseases	*Frederick J. Bailey, M. D	Do.
Bacteriological laboratory.	*Karl R. Bailey, M. D	Do.
Food	*P. H. Mullowney, D. V. M	Do.
Child hygiene	Charles F. Wilinsky, M. D	Do.
Sanitary	*Thomas J. Donnellon	Do.
Tuberculosis	*George O'Donnell, M. D	Do.
Vital statistics	*Joseph W. Monahan	Do.
Braintree	*Harry F. Vinton, sr	Agent, board of health.
Brockton	Joseph H. Lawrence, M. D	Health officer.
Brookline	Francis Parkman Denny, M. D	Do.
Cambridge	S. B. Kelleher, M. D	Medical inspector.
Chelsea	*John F. Welch	Health officer.
Chicopee	*Gertrude M. DeWitt	Agent, board of health.
Clinton	*Frederick E. Murphy	Do.
Danvers	*Hugo Nappe, R. N	Health officer.
Dedham		
Easthampton	C. C. Buckner	Agent, board of health.
Everett	*William F. Hogan	Do.
Fairhaven	C. E. P. Thompson, M. D	Board of health physician.
Fall River	*Ernest M. Morris, M. D	Health commissioner.
Fitchburg	*Fred R. Brigham	Agent, board of health.
Framingham	*David Moxon, B. Sc. in bacteriology, C. P. H.	Do.
Gardner	*William P. O'Donnell	Do.
Gloucester	George S. Rust, M. D	Health officer.
Greenfield	*George P. Moore	Agent, board of health.
Haverhill	*George T. Lennon	Do.
Holyoke		
Lawrence	Aime D. V. Bourget	Chairman, board of health.
Leominster	*Hugh E. Crain	Agent, board of health.
Lowell		
Lynn	Walter L. Burns, M. D	Commissioner of public health.

City	Name of health officer	Official title
Massachusetts—Continued.		
Malden	*Frederick Walmsley	Health inspector of contagious diseases.
Marlborough	*John J. Cassidy	Agent, board of health.
Medford	William N. Lanigan, M. D.	Medical inspector.
Melrose	Clarence P. Holden, M. D.	Chairman, board of health.
Methuen	John Oddy, M. D.	Health physician.
Milford	James F. McDonough	Sanitary inspector.
Milton	Paul W. Kimball, M. D.	Agent, board of health.
Natick	Thomas F. Morris	Do.
Needham	*G. Donald Buckner	Health officer and milk inspector.
New Bedford	*Wm. G. Kirschbaum	Agent and executive officer.
Newburyport	*Wilbur N. O'Brien, Ph. G.	Agent, board of health.
Newton	*Francis George Curtis, M. D.	Chairman, board of health.
North Adams	*Douglas W. Hyde, S. E.	Agent, board of health.
North Attleboro	Michael E. Vance, M. D.	Health officer.
Northampton	*Geo R. Turner	Agent, board of health.
Norwood	James J. Mulvehill, D. V. M.	Agent and inspector of milk.
Peabody	*Percy F. Murray	Health agent.
Pittsfield	*Willys M. Monroe, M. D.	Health officer.
Plymouth	Walter D. Shurtleff, M. D.	Do.
Quincy	Cornelius J. Lynch, M. D.	Health commissioner.
Revere	Francis Lacitz, M. D.	Chairman and health officer.
Salem	*John J. McGrath	Agent, board of health.
Saugus	Charles E. Light	Chairman, board of health.
Somerville	Frank L. Morse, M. D.	Medical inspector and bacteriologist.
Southbridge	*Albert R. Brown	Agent, board of health.
Springfield	*Jacob R. Sackett	Agent and health officer.
Stoneham	*George A. Hinchcliffe	Secretary and health officer.
Swampscott	*Clarence W. Horton	Health officer.
Taunton	Thomas F. Cusick, M. D.	Chairman, board of health.
Wakefield	David Taggart	Health officer and agent.
Waltham	Frederick L. MacDonald, M. D.	Director of public welfare.
Watertown	*Arthur E. Burke, C. P. H.	Agent, board of health.
Webster	Joseph C. Sullivan, M. D.	Health officer.
Wellesley	Curtis M. Hilliard	Supervisor of health.
West Springfield	John J. Lysaght	Agent, board of health.
Westfield	R. M. Marr, M. D.	Chairman, board of health.
Weymouth	F. L. Doucett, M. D.	Clerk, board of health.
Winchester	*Maurice Dinneen	Agent, board of health.
Winthrop	*William D. Childress	Health officer and agent.
Woburn	*Edward T. Gorman	Agent and secretary.
Worcester		
Michigan:		
Adrian	A. B. Hewes, M. D.	City physician and health officer.
Alpena	D. A. Cameron, M. D.	City physician.
Ann Arbor	John A. Wessinger, M. D.	Health officer.
Battle Creek	*A. A. Hoyt, M. D.	Health officer and registrar.
Bay City	G. W. Moore, M. D.	Health officer.
Benton Harbor	William Clinton Ellet, M. D.	Director of public health.
Dearborn	C. A. Christensen, M. D.	Commissioner of health.
Detroit	Board of health—	
	William A. Evans, M. D.	President.
	L. O. Geib, M. D.	Vice president.
	Gustavus D. Pope	
	William H. Maybury	
	Executive staff, department of health—	
	*Henry F. Vaughan, Dr. P. H.	Commissioner of health.
	Bert U. Estabrook, M. D.	Deputy commissioner.
	*Fred M. Meader, M. D.	Deputy commissioner and executive officer.
	*John F. Norton, Ph. D.	Director of laboratories.
	*Don W. Gudakunst, M. D.	Deputy commissioner and medical director.
	A. C. Thompson, D. D. S.	Director of school dental service.
	*Miss Grace Ross, R. N.	Superintendent of nursing.
	Ward F. Seeley, M. D.	Director of Herman Kiefer Hospital maternity division.
	Russell W. Alles, M. D.	Director, of prenatal division.
	*Major John F. Roehl	Director of special investigation.
	*R. S. Dixon, M. D.	Director of division of venereal diseases.
	*Henry D. Chadwick, M. D.	Tuberculosis controller.
	*B. H. Douglas, M. D.	Superintendent of William H. Maybury Sanatorium.
	*George E. Phillips	Superintendent of Herman Kiefer Hospital.
	*F. Gardner Legg, C. E.	Director of sanitary engineering.
	*Edward C. Schultz	Director of dairy and food inspection.
	*Arthur P. Derby, M. D.	Director of division of tuberculosis.
	Don J. Barnes, M. D.	Director of division of child welfare.
	*F. B. Broderick, M. D.	Director of division of hairdressers and cosmeticians.

City	Name of health officer	Official title
Michigan—Continued.		
Detroit—Continued	Executive staff, department of health—Continued.	
	*G. Arthur Blakeslee	Director of division of vital statistics.
	C. E. Dutchess, M. D	Director of division of cancer control.
	*John E. Gordon, M. D	Medical epidemiologist of Herman Kiefer Hospital.
Ecorse	Lawrence Henry Van Becelaere, M. D.	Health officer.
Escanaba		
Ferndale	Eugene L. Spoehr, M. D	Do.
Flint	*Charles J. Scavarda, M. D	Health officer and registrar.
Grand Rapids	*Allison H. Edwards, M. D	Health officer.
Grosse Pointe	*B. H. Warren, M. D	Do.
Hamtramck	Charles Reynolds Sheridan, M. D.	Health commissioner.
Highland Park	William N. Braley, M. D	Health officer.
Holland	Wm. Westrate, M. D	Do.
Iron Mountain	James L. Browning, M. D	Do.
Ironwood	*Louis Dorpat, M. D	Do.
Jackson	*Floyd R. Town, M. D	Do.
Kalamazoo	*A. H. Rockwell, M. D	Do.
Lansing	*S. R. Hill, M. D	Health director.
Lincoln Park	Dan. R. Herkimer, M. D	Health officer.
Marquette	*T. R. Laughbaum, M. D	Do.
Menominee	E. V. McComb, M. D	Do.
Monroe	Wm. F. Acker, M. D	City physician.
Mount Clemens	W. J. Kane, M. D	Do.
Muskegon	R. J. Harrington, M. D	Do.
Muskegon Heights	Otto M. La Core, M. D	City physician and health officer.
Niles	Lawrence M. Rutz, M. D	Commissioner of health.
Owosso	W. E. Ward, M. D	Health officer.
Pontiac	*Charles A. Neafie, M. D., M. S. P. H.	Director of public health.
Port Huron	Albert L. Callery, M. D	Health officer.
River Rouge	Claude A. Smith, M. D	Do.
Royal Oak	Ralph M. Vincent, M. D	Director of public health.
Saginaw	*Garland Weidner, M. D	Health officer.
Sault Ste. Marie	E. A. Cornell, M. D	Do.
Traverse City	G. A. Holliday, D. D. S., M. D	Do.
Wyandotte	Arthur P. Schulz, M. D	Commissioner of health and sanitation.
Ypsilanti	D. N. Robb, M. D	Health officer.
Minnesota:		
Albert Lea	Donald S. Branham, M. D	Do.
Austin	J. K. McKenna, M. D	Chairman, board of health.
Brainerd		
Duluth	Lincoln A. Sukeforth, M. D	Director of health.
Faribault	Frederick U. Davis, M. D	Health commissioner.
Hibbing	G. N. Butchart, M. D	Health officer.
Mankato	John A. Butzer, M. D	Do.
Minneapolis	*Francis Edward Harrington, LL. D., M. D.	Commissioner of health.
Rochester	C. H. Mayo, M. D.[1]	Health officer.
St. Cloud	J. N. Libert, M. D	City physician.
St. Paul	*B. F. Simon, M. D	Chief health officer.
South St. Paul	O. S. Ely, M. D	Commissioner of health.
Virginia	R. P. Pearsall, M. D	Health officer.
Winona	William V. Lindsay, M. D	Do.
Mississippi:		
Biloxi	G. F. Carroll, M. D	City health officer.
Clarksdale	Vernon Baker Harrison, M. D	Director of health.
Columbus	Charles Edward Lehmberg, M. D.	Health officer.
Greenville	*John W. Shackelford, M. D	Director, county health department.
Greenwood	*Levi A. Barnett, M. D	Director of health.
Gulfport		
Hattiesburg	*W. D. Beacham, M. D	County health officer.
Jackson	*W. E. Noblin, M. D	Field agent, U. S. Public Health Service.
Laurel	*(Mrs.) Clyde K. Barr, R. N	Director of health.
McComb	*T. Paul Haney, jr., M. D., C. P. H.	County health officer.
Meridian	*J. L. Googe, M. D	Director, county health unit.
Natchez	*Loren Wallin, M. D	County health officer.
Vicksburg		
Missouri:		
Cape Girardeau		
Columbia	W. A. Norris, M. D	City health commissioner.
Hannibal	*E. M. Lucke, M. D	Field agent, U. S. Public Health Service.

[1] D. C. Lockhead, M. D., D. P. H., deputy health officer, full time.

City	Name of health officer	Official title
Missouri—Continued		
Independence	F. L. Cook, M. D.	City physician and dairy inspector.
Jefferson City	Louis A. T. Meyer, M. D.	City physician.
Joplin	*M. B. Harutun, M. D.	Commissioner of health and sanitation.
Kansas City	*Calvin L. Cooper, M. D.	Director of health.
Maplewood	Ernest E. Tremain, M. D.	Health commissioner.
Moberly	Jesse Maddox, M. D.	City health commissioner.
St. Charles	Will L. Freeman, M. D.	City physician and health officer.
St. Joseph	A. J. Smith, M. D.	City health officer.
St. Louis	*Max C. Starkloff, M. D.	Health commissioner.
	*Max Kaufman	Deputy health officer.
Sanitary section	*Walter Cook	Director.
Vital-statistics section	*Leon Grosch	Do.
Dental section	*Dr. Horbard Towles	Do.
Chemical - bacteriological section.	*Thomas Buckland	Chief chemist.
	*Dr. J. C. Willett	Chief bacteriologist.
Communicable disease section.	*Dr. J. A. Smith	Director.
Venereal-disease section	*Dr. Marriott T. Morrison	Chief physician.
Municipal visiting nurses	*Mrs. Bertha Yenicek	Director.
Tuberculosis controller	*Dr. Howard Bell	Do.
Sedalia	*R. Weikal	Sanitary officer.
Springfield	*Lon Sharp	Commissioner of health and sanitation.
University City	Leo P. Fitz Gerald, M. D.	Commissioner of health.
Webster Groves	Carl C. Irick, M. D.	Health commissioner.
Montana:		
Anaconda	F. J. Malloy, M. D.	Health officer.
Billings	Elmer G. Balsam, M. D.	Secretary, board of health.
Butte	Joseph J. Kane, M. D.	City physician.
Great Falls	*F. L. Watkins, M. D.	County health officer and field agent, U. S. Public Health Service.
Helena	*Arthur Jordan, M. D.	Field agent, U. S. Public Health Service.
Missoula	*F. D. Pease, M. D.	Health officer.
Nebraska:		
Beatrice	G. L. Roe, M. D.	Do.
Fremont	J. S. Devries, M. D.	City physician.
Grand Island	J. G. Woodin, M. D.	Do.
Hastings	J. P. Feese, M. D.	Do.
Lincoln	M. F. Arnholt, M. D.	Superintendent of health.
Norfolk	C. J. Verges, M. D.	City physician.
North Platte	J. B. Redfield, M. D.	Do.
Omaha	A. S. Pinto, M. D.	Health commissioner.
Nevada:		
Reno	Albert F. Adams, Ph. G., M. D.	Secretary, board of health.
New Hampshire:		
Berlin	*Eli A. Marcoux	Health officer and milk inspector.
Claremont	William P. Prescott	Health officer.
Concord	*Charles E. Palmer	Sanitary officer.
Dover	*Wm. E. Whiteley	Executive officer.
Keene	*Fred C. Nims	Health officer.
Laconia	J. R. Perley, M. D.	Member, board of health.
Manchester	*Howard A. Streeter, M. D.	Health officer.
Nashua	P. J. McLaughlin, M. D.	Chairman, board of health.
Portsmouth		
Rochester	C. E. Goodwin	Health officer.
New Jersey:		
Asbury Park	*B. H. Obert	Do.
Atlantic City	Samuel L. Salasin, M. D.	Do.
Bayonne	William W. Brooke, M. D.	Do.
Belleville	*Eugene T. Berry	Do
Bloomfield	*Joseph C. Saile, Ph. G., D. V. S., D. O.	Registrar, secretary, and health officer.
Bridgeton	*John G. Robbins	Sanitary inspector.
Burlington	*Kathryn C. Shedaker	Health officer, secretary, registrar and sanitary inspector.
Camden	*Arthur L. Stone, M. D.	Director of public health.
Carteret	H. L. Strandberg, M. D.	Health officer.
Cliffside Park	Frederick J. Dyer	Health officer and sanitary inspector.
Clifton	Jerimiah P. Quinlan	Health officer.
Collingswood	Harold K. Eynon, M. D.	Medical inspector.
Dover	*John G. Taylor	Health officer.
East Orange	*Frank J. Osborne	Health officer and secretary.
Elizabeth	*Louis J. Richards, S. B. in sanitary engineering.	Health officer.
Englewood	*John A. Manson	Sanitary inspector.
Garfield	Charles Bleaseby, M. D.	Health officer.
Gloucester City	J. Alonzo Beck, M. D.	Do.
Hackensack	*L. Van D. Chandler	Do.
Harrison	*John T. McClure	Do.
Hawthorne	William Missonellie, M. D.	Sanitary inspector.
Hoboken	J. F. X. Stack, M. D.	Commissioner of health.
Irvington		

City	Name of health officer	Official title
New Jersey—Continued.		
Jersey City	*James J. Hagan	Health officer.
Kearny	*Amos Field, jr	Do.
Linden	*Miss Maidie E. Noe	Do.
Lodi	H. H. Brevoort, M. D	Do.
Long Branch	*R. C. Errickson	Do.
Millville	Richard H. Knowles	Do.
Montclair	*Carl T. Pomeroy, C. P. H	Do.
Morristown	*John F. Kilkenny	Do.
New Brunswick	E. Irving Cronk, M. D	Do.
Newark	*Charles V. Craster, D. P. H., M. D.	Do.
Nutley	*Eugene H. Sullivan, R. N	Do.
Orange	*Lenore Young Wylie, R. N	Health officer and registrar of vital statistics.
Passaic	John N. Ryan, M. D	Health officer.
Paterson	*Frederick P. Lee, M. D	Do.
Perth Amboy	*Chas. S. Thompson, D. V. S	Do.
Phillipsburg	Alma L. Williston, M. D	Do.
Plainfield	*N. J. Randolph Chandler	Health officer and registrar.
Pleasantville		
Rahway	*Fred M. Williams	Health officer.
Red Bank	W. H. Lawes, jr , D V. M	Sanitary inspector.
Ridgefield Park	*William F. Reynolds, D. V. M	Health officer.
Ridgewood	Harry H Pettit, M. D	Do.
Roselle	Perry A. Proudfoot, M. D	Do.
Rutherford	*Marino Dunn	Sanitary inspector.
South Orange	A. C. Benedict, M D	Health officer.
South River	S. Evans Sclover, M. D	Sanitary inspector.
Summit	Henry P. Dengler, M. D	Executive officer.
Trenton	*Alton S. Fell, M. D	Health officer.
Union City	Grant P Curtis, M. D	Do.
West New York	*Rudolph Kunze	Chief inspector.
West Orange	*David E. Buckley	Health officer.
Westfield	*Andrew Carney	Do.
New Mexico:		
Albuquerque	*James R. Scott, Ph. D., M. D	County health officer.
Roswell	William W. Phillips, M. D	Do.
Santa Fe	*E. B. Godfrey, M. D	County and city health officer.
New York:		
Albany	James W. Wiltse, M. D	Health officer.
Amsterdam	P. J. Fitzgibbons, M. D	Do.
Auburn	John W. Copeland, M. D	Do.
Batavia	E. F. Will, M. D	Do.
Beacon	Charles B. Dugan, Ph. B., M. D.	Do.
Binghamton	Chalmer J. Longstreet, M. D	Do.
Buffalo	*Francis E. Fronczak, LL. D., M. D , Dr. Sc. P. H.	Health commissioner.
	*Edward Durney, M. D	Deputy health officer.
	*Charles A. Bentz, M. D	Do.
Division of child hygiene	*Edward Durney, M. D	Director.
Communicable disease and division of laboratories.	*Charles A. Bentz, M. D	Do.
Division of vital statistics	*G. H. Westinghouse, M. D	Registrar.
Division of sanitation	*Frank Smering	Assistant superintendent.
Division of food and drugs	*Stephen Bateson	Do.
Cohoes	Matthew J Keough, M. D	Commissioner of health.
Corning	Henry E. Elwood, jr., M. D	Health officer.
Cortland	*Daniel R. Reilly, M. D., C. P. H.	County health commissioner.
Dunkirk	George E. Ellis, M. D	Health officer.
Elmira	Reeve B. Howland, M. D	City health officer.
Endicott	Mark W. Welch, M. D	Health officer.
Floral Park	Arthur E. Goldfarb, M. D	Do.
Freeport	William H. Runcie, M. D	Do.
Fulton	L. A. Simpson, M. D	Do.
Geneva	C. W. Grove, M. D	Do.
Glen Cove	Joseph B. Conolly, M. D	Do.
Glens Falls	*Virgil D. Selleck, M. D., C. P. H.	Do.
Gloversville	A. L. Johnson, M. D	Do.
Hempstead	Smith A. Combes, M. D	Do.
Herkimer	James W. Graves, M. D	Do.
Hornell	George E. Taylor, M. D	Do.
Hudson	William D. Collins, M. D	Do.
Ithaca	*Lewell T. Genung, M. D	Health officer and school physician.
Jamestown	William M. Sill, M. D	Superintendent of public health.
Johnson City		
Johnstown	Guy Vail Wilson, M. D	Commissioner of public health and welfare.
Kenmore	E. R. Linklater, M. D	Health officer.
Kingston	Lester E. Sanford, M. D	Do.
Lackawanna	A. S. Culkowski, M. D	Do.
Little Falls	George S. Eveleth, M. D	Do.

City	Name of health officer	Official title
New York—Continued.		
Lockport	*F. A. Kittinger, M. D	Health officer.
Lynbrook	F. M. Galloway, M. D	Do.
Mamaroneck	Edward M. Clark, M. D	Do.
Massena	C. E. Elkins, M. D	Do.
Middletown	H. J. Shelley, M. D	Do.
Mount Vernon	Frank W. Shipman, M. D	Commissioner of health.
New Rochelle	*Edward H. Codding, M. D	Health officer.
New York	Shirley W. Wynne, M. D., Dr. P. H.	Commissioner of health.
	Herman T. Peck, M. D	Deputy commissioner of health.
Bureau—		
General Administration	Bernard F. Plunkett	Secretary.
Records	John T. Walsh, M. D	Acting director.
Sanitation	William H. Pound, M. D	Sanitary superintendent.
Preventable diseases	Edward L. Creeden, M. D	Acting director.
Child hygiene	Jules L. Blumenthal, M. D	Director.
Nursing	Miss Amelia H. Grant	Do.
Public health education	Charles F. Bolduan, M. D	Do.
Laboratories	William H. Park, M. D	Do
Food and drugs	Thomas F. Everett	Acting director.
Newburgh	Thomas J. Burke, M. D	Health officer.
Niagara Falls	E. E. Gillick, M. D	Do.
North Tonawanda	Henry C. Lapp, M. D	Do.
Ogdensburg	John W. Benton, M. D	Do.
Olean	John A. Johnson, M. D	Health commissioner.
Oneida	D. H. Conterman, M. D	Health officer.
Oneonta		
Ossining		
Oswego	Harvey S. Albertson, M. D	Do.
Peekskill	Harold H. Golding, M. D	Do.
Plattsburg	Leo F. Schiff, M. D	Do.
Port Chester	William J. Sheehan, M. D	Do.
Port Jervis	G. Otto Pope, M. D	City health officer.
Poughkeepsie	*William H. Conger, M. D	Health officer.
Rensselaer	Charles H. Harbinson, M. D	Do.
Rochester	*George W. Goler, M. D	Do
Rockville Center	Arthur D. Jaques, M. D	Do.
Rome	Lewis N. Eames, M. D	Do.
Saratoga Springs	Charles B. Small, M. D	City health officer.
Schenectady	Fred J. MacDonald, M. D	Commissioner of health.
Syracuse	*George C. Ruhland, M. D	Do.
Tonawanda	Russell H. Wilcox, M. D	Health officer.
Troy	James H. Flynn, M. D	Commissioner of health.
Utica	Hugh H. Shaw, M. D	Health officer.
Valley Stream	Bernard J. Goldfarb, M. D	Do.
Watertown	G. B. Van Doren, M. D	Do.
Watervliet	C. A. Birmingham, M. D	Commissioner of health.
White Plains	Matthias Nicoll, jr., M. D	Do.
Yonkers	Clarence W. Buckmaster, M. D., C. P. H.	Do.
North Carolina:		
Asheville	*D. E. Sevier, M. D	Do.
Charlotte	*Wilbur Ashley McPhaul, M. D	Superintendent of health.
Concord	*D. G. Caldwell, M. D	County health officer.
Durham	*J. H. Epperson	Superintendent of health.
Elizabeth City	I. A. Ward, M. D	Health officer.
Fayetteville	*L. L. Williams, M. D., C. P. H.	City and county health officer.
Gastonia	Mc. G. Anders, M. D	City physician and health officer.
Goldsboro	*F. M. Register, M. D	Director of public health.
Greensboro	*C. Curtis Hudson, M. D	City health officer.
High Point	W. J. McAnally, M. D	Health officer.
Kinston	*Z. V. Mossby, M. D	County health officer.
New Bern	N. M. Gibbs, M. D	Health officer.
Raleigh	*A. C. Bulla, M. D	Do.
Rocky Mount	*Roy Norton, M. D	Director, department of public health.
Salisbury	*C. W. Armstrong, M. D	City and county health officer.
Shelby	D. F. Moore, M. D	City health officer.
Statesville	James Alexander, M. D	City physician.
Thomasville	*G. C. Gambrell, M. D	County health physician.
Wilmington	*John H. Hamilton, M. D	County health officer.
Wilson	*C. L. Swindell, M. D	City and county health officer.
Winston-Salem	*R. L. Carlton, M. D	City health officer.
North Dakota:		
Bismarck	C. E. Stackhouse, M. D	Do.
Fargo	*B. K. Kilbourne, M. D	Do.
Grand Forks	E. O. Haagensen, M. D	Do.
Minot	Frank E. Wheelon, M. D	Do.
Ohio:		
Akron	*Melville D. Ailes, LL. B., M. D	Director of health.
Alliance		
Ashland	C. B. Mouser, M. D	Director of welfare.
Ashtabula	Azro J. Pardee, M. D	Health officer.
Barberton	H. A. Pinefrock, M. D	Health commissioner.
Bellaire	W. J. Shepard, M. D	Do.

City	Name of health officer	Official title
Ohio—Continued.		
Bucyrus	W. G. Carlisle, M. D	Health commissioner.
Cambridge	C. L. Vorhies, M. D	Do.
Campbell	James S. Mariner, M. D	Do.
Canton	*Frank M. Sayre, M. D	Do.
Chillicothe	*R. E. Bower, Ph. B., M. D	Do.
Cincinnati	*Wm. H. Peters, M. D., Dr. P. H.	Commissioner of health.
Cleveland	*H. J. Knapp, M. D	Do.
Division—		
Communicable diseases	T. G. Duncan, M. D	Director.
Child hygiene	R. J. Ochsner, M. D	Do.
Food and drug administration.	R. F. Leslie, D. V. M	Do.
Laboratories	E. B Buchanan	Do.
Cleveland Heights	*Robert Lockhart, M. D	Director of health.
Columbus	*Nelson C. Dysart, M. D	Health commissioner.
Coshocton		
Cuyahoga Falls	*R. H Markwith, M. D	Do.
Dayton	*A. O. Peters, M. D	Do.
East Cleveland	George W. Stober, M D	Director of health.
East Liverpool	Edward W. Miskall, M. D	Health commissioner.
Elyria	George E French, M. D	Do.
Euclid	*Robert Lockhart, M. D	District health commissioner.
Findlay	*K. B. Clark	City health commissioner.
Fostoria	*L. W. Gibson	Health commissioner.
Fremont		
Garfield Heights	*Robert Lockhart, M. D	District health commissioner.
Hamilton	*C. J. Baldridge, B. L., M. D	City and county health commissioner.
Ironton	H. S. Allen, M. D	Health commissioner.
Lakewood	Wallace J. Benner, M. D	Commissioner of health.
Lancaster	Clifford B. Snider, M. D	Health commissioner.
Lima	James B. Poling, M. D	Do.
Lorain	Valloyd Adair, M. D	Health commissioner.
Mansfield	*Millard C. Hanson, M. D	Do.
Marietta	J. B. McClure, M. D	Do.
Marion	*N. Sifritt, M. D	Do.
Martins Ferry	*John Donovan	Do.
Massillon	*John H. Williams	Do.
Middletown	*G. D. Lummis, M. D	Do.
New Philadelphia	*Jos. Blickensderfer, M. D	Do.
Newark	Wm. Henry Knauss, M. D	Do.
Niles	William A. Werner, M. D	Do.
Norwood		
Painesville	*Mrs. Clara C. Wilder, R. N.	Do.
Parma	*Robert Lockhart, M. D	District health commissioner.
Piqua	L. G. Whitney	Health commissioner.
Portsmouth	Oral D. Tatje, M. D	Commissioner of health.
Salem	T. T. Church, M. D	Health commissioner.
Sandusky	*F. M. Houghtaling, M. D	Do.
Shaker Heights	*Robert Lockhart, M. D	Do.
Springfield	*Howard C. Lisle, Ph. C., M. D.	Health director.
Steubenville	*Julius A. Pizzoferrato	City health commissioner.
Struthers	Charles Scofield, M. D	Health commissioner.
Tiffin	*J. A. Gosling, M. D	Do.
Toledo	*John L. Lavan, M. D	Do.
Warren	M. T. Knappenberger, M. D	Do.
Wooster	*William G. Rhoten, M. D.	Do.
Xenia	A. D. DeHaven, M. D	Do.
Youngstown	H. E. Welch, M. D	Commissioner of health and welfare.
Zanesville	David J. Evans, M. D	Superintendent of health.
Oklahoma:		
Ada	W. R. Threlkeld, M. D	Health officer.
Ardmore	A. Y. Easterwood, M. D	City physician.
Bartlesville	Elizabeth W. Chamberlin, M. D.	Do.
Chickasha		
Enid		
Lawton	*W. P. Ford	City chemist.
McAlester	*Chas. M. Pearce, M. D	Superintendent of health.
Muskogee	A. W. Harris, M. D	City superintendent of health.
Oklahoma City	*W. H. Miles, M. D	Director of health.
Okmulgee	Ben. G. Hardcastle	City health officer.
Ponca City	*Mildred Headly, R. N	Superintendent, board of health.
Sapulpa	J. M. Mattenlee, M. D	City physician.
Seminole		
Shawnee	T. C. Sanders, M. D	Do.
Tulsa	*Harry J. McGuire, M. D	Superintendent of health.
Wewoka	*Geo. Hunter, M. D	Field agent, U. S. Public Health Service.
Oregon:		
Astoria	Nellie S. Vernon, M. D	City and county health officer.
Eugene	*Seth M. Kerron, M. D	Do.
Klamath Falls		
Medford	L. D. Inskeep, M. D	City health officer.

City	Name of health officer	Official title
Oregon—Continued.		
Portland	*John G. Abele, M. D	City health officer.
Salem	*Vernon A. Douglas, M. D	Do
Pennsylvania:		
Aliquippa	*J. E. Tanner	Health officer.
Allentown	J. Treichler Butz, D. D. S., M. D.	Do.
Altoona	*T. G. Herbert	Chief, bureau of health.
Ambridge	*Louis Herrmann	Health officer.
Arnold	A. B. Bishop	Do.
Beaver Falls	*Nelson W. Osmond	Health officer and plumbing inspector.
Bellevue	*James B. Arthur	Health officer
Berwick	*Charles E. Ross	Do.
Bethlehem	F. J. Conahan, M. D	City health physician.
Braddock	*Jas. E. Wills	Health officer.
Bradford	*R. G. Vogel	Do.
Bristol		
Butler	*J. Fred Leetch	Do.
Canonsburg		
Carbondale		
Carlisle	*John T. Glass	Do.
Carnegie	*Joseph Lewis	Ordinance officer.
Chambersburg	*Frank J. Croft	City health officer and secretary.
Charleroi	*W. M. Darby	Health inspector.
Chester		
Clairton	*F. F. Keller	Health officer
Coatesville	Charles V. Peace, V. M. D., M D.	Do.
Columbia	George M. Rodenhauser	Do.
Connellsville	*D. E. Minerd	Health officer and sealer of weights and measures.
Conshohocken	Thomas S. White	Health officer.
Coraopolis	F. H. Stark	Do.
Dickson City		
Donora	*Herman Lang	Do.
Dormont	John E. Madden, M. D	Do.
Du Bois	J. I. Brockbank, M. D	City health officer.
Dunmore	William Ferrese	Health officer.
Duquesne	*Emil Elmgren	Do.
Easton	J. A. Stotz, M. D	City health officer.
Ellwood City	*Louis Young	Health officer and milk inspector.
Erie	James R. Smith, M. D	Health officer.
Farrell	*Harry N. Schmidt	Do.
Franklin		
Greensburg	*T. Ray Hunter	Do.
Hanover	*F. Y. Stambaugh	Do.
Harrisburg	John M. J. Raunick, M. D	Do.
Hazleton	*William Pfaff	Do.
Homestead	*Morris D. Weis	Do.
Jeannette	*Charles E. Walter	Chief health officer.
Johnstown	L. W. Jones, M. D	Health officer.
Kingston	*F. J. Seward	Do.
Lancaster	*Benj F. Charles	Do.
Latrobe	W. T. Osborne	Do.
Lebanon		
Lewistown	H. E. Fetterolf	Do.
McKeesport	*Daniel F. Marsh	Do.
McKees Rocks		
Mahanoy City	*J. B. Kleindienst	Do.
Meadville	*John Laley	Do.
Monessen	*Francis E. Gibson	City health officer.
Mount Carmel	*Charles F. Cohoon	Health officer.
Munhall	Charles Watt	Do
Nanticoke	*D. F. Sakowski	Do.
New Castle	William L. Steen, M. D	Do.
New Kensington	A. J. Bower, M. D	Secretary, board of health.
Norristown	*R. Ronald Dettie	Secretary and health officer.
North Braddock	*Michael J. Pastor	Health officer.
Oil City	*William J. Lewis	Do.
Old Forge	George Allen	Do.
Olyphant	*Ignatious Zewan	Do.
Philadelphia	*A. A. Cairns, M. D., Dr. P. H.	Director, department of public health.
	*Michael C. Coglia	Assistant director, department of public health.
Bureau of health	*William J. Wolf	Secretary.
Bureau of hospitals	*William L. Thatcher	Chief.
Philadelphia General Hospital, Thirty-Fourth and Pine Streets.		
Philadelphia Hospital for Contagious Diseases, Second and Luzerne Streets.		
Philadelphia Hospital for Mental Diseases, Byberry.		

City	Name of health officer	Official title
Pennsylvania—Continued.		
Phoenixville	*Russell E. Deery	Health officer.
Pittsburgh	*Charles B. Maits, M. D	Director, department of public health.
Bureau of infectious diseases (including municipal and tuberculosis hospitals).	*P. E. Marks, M. D	Superintendent.
Bureau of sanitation	*Charles Parkinson	Do.
Bureau of child welfare	*H. J. Benz, M. D	Do.
Bureau of food inspection	*J. C. McNeil, V. M. D	Do.
Bureau of smoke regulation.	*H. B. Meller, C. E	Do.
	*Fred E. Obley	Chief clerk.
Pittston	*Michael A. McHale	Health officer.
Plymouth	*H. G. Templeton, M. D	Secretary, board of health.
Pottstown		
Pottsville	*A. C. Huntzinger	Health officer.
Reading	*Ira J. Ham, M. D	Do.
Scranton	Frank G. Bryant, M. D	Director of health.
Shamokin	*Frederick Zeiser	Health officer.
Sharon	*Louis C. Brainard	Sanitary officer.
Shenandoah	*Joseph Meluskey	Health officer.
Steelton	*E. G. Butler	Do.
Sunbury	*Victor A. Koble	Do.
Swissvale	*Samuel L. Glasgou	Do.
Tamaqua		
Taylor	E. E. Edwards, M. D	Do.
Turtle Creek	*Manuel Emmanuel	Do.
Uniontown	*W. C. Hall	Do.
Vandergrift	Thos. J. Wyatt	Do.
Warren	*R. N. Brown	Do.
Washington	*Thos. W. Henderson	Do.
Waynesboro	*Percy H. Snowberger	Do.
West Chester	*Enoch Hershey	Do.
Wilkes-Barre	*Charles B. Crittenden, M. D., C. P. H.	Principal health officer.
Wilkinsburg		
Williamsport	*Robert F. Trainer, M. D	Health officer.
York	J. Frank Small, M. D	Director of public health.
Rhode Island:		
Bristol	Octave Le Clair	Health officer.
Central Falls	C. S Doucet, M. D	Superintendent of health.
Cranston	Daniel S. Latham, M. D	Do.
East Providence	W. H. T. Hamill, M. D	Health officer.
Newport	Edward V. Murphy, M. D	Commissioner of health.
North Providence	*Herbert A. Brown	Health officer.
Pawtucket	Florian A. Ruest, M. D	Superintendent of health.
Providence	*Charles V. Chapin, LL. D., M. D.	Do.
Warwick	*Lawrence Jackson Smith, M. D., C. P. H., Apponaug.	Commissioner of health.
West Warwick		
Westerly	Samuel C. Webster, Ph. G., M. D.	Superintendent of health.
Woonsocket	Thomas S. Flynn, M. D	Health officer.
South Carolina:		
Anderson	*E. E. Epting, M. D	Director of health unit.
Charleston	*Leon Banov, M. D	City and county health officer.
Columbia	Paul Eugene Payne, M. D	Health officer.
Florence	*George Dawson Heath, M. D., Dr. P. H.	Health commissioner.
Greenville	*Irving Sydnor Barksdale, M. D	Commissioner of health.
Greenwood	*Joseph E. Brodie, M. D	Health officer.
Rock Hill	R. D. Sumner, M. D	Medical officer.
Spartanburg		
Sumter	*John R. Sumter	Health officer.
South Dakota:		
Aberdeen	M. C. Johnston, M. D	City and county health officer.
Huron	W. H. Griffith, M. D	City health officer.
Mitchell	E. M. Young, M. D	Health officer.
Rapid City	*F. J. Austin, M. D	County health officer.
Sioux Falls	W. E. Donahoe, M. D	Health officer.
Watertown	George H. Richards, M. D	City health officer.
Tennessee:		
Bristol	J. A. Delaney, M. D	City physician.
Chattanooga	*Fred C. McIsaac, M. D	Director of health.
Jackson	Herman Hawkins, M. D	City health officer.
Johnson City	*Wallace L. Poole, M. S. in P. H., M. D.	Director, county and city health departments.
Kingsport		
Knoxville	*William H. Enneis, M. D., M. P. H.	City health officer.
Memphis	*L. M. Graves, M. D	Superintendent, health department.
Nashville	*John Overton, M. D	City health officer.

City	Name of health officer	Official title
Texas:		
Abilene	Scott W. Hollis, M. D	County and city health officer.
Amarillo	*B. M. Primer, M. D., M. P. H.	Director of health.
Austin	*Lee E. Edens, M. D.	Director of public health and welfare.
Beaumont	Dru McMickin, M. D	City health officer.
Big Spring	M. H. Bennett, M. D	Health officer.
Brownsville	Harry K. Loew, M. D	City health officer.
Brownwood	D. R. Scott, M. D	Health officer.
Cleburne	T. Wendell Pickens, M. D	City health officer.
Corpus Christi	Burch Thompson, M. D	Do.
Corsicana	Wm. R. Snood, M. D	City physician.
Dallas	*J. W. Bass, M. D	Director of public health.
Del Rio	B. F. Orr, M. D	City health officer.
Denison	W. A. Lee, M. D	Do.
El Paso	*Pham Rivers Outlaw, M. D	Health officer.
Fort Worth	*Arthur Heath Flickwir, surgeon (R), U. S. Public Health Service.	Director of public health and welfare.
Galveston	Walter Kleberg, M. D	City health officer.
Greenville	Benj. F. Arnold, M. D	Do.
Harlingen	Frank D. Walsworth, M. D	Do.
Houston	*Allen C. Hutcheson, M. D	Do.
Laredo		
Lubbock		
Marshall		
Palestine	J. M. Colley, M. D	Do.
Pampa	Archie Cole, M. D	Do.
Paris	D. S. Hammond, M. D	Do.
Port Arthur	J. A. Broussard, M. D	Do.
San Angelo	A. C. De Long, M. D	Do.
San Antonio	*W. A. King, M. D	Health officer.
San Benito		
Sherman		
Sweetwater	*M. H. Jenson, M. D	Director, county health unit.
Temple		
Texarkana		
Tyler	Albert Woldert, Ph. G., M. D	City health officer.
Waco	R. W. Crosthwait, M. D	Do.
Wichita Falls	*H. D. Fillmore, M. D	City physician.
Utah:		
Ogden	N. H. Savage, M. D	Do.
Provo		
Salt Lake City	W. Christopherson, M. D	Health commissioner.
Vermont		
Barre	*Marshall D. Lamb, M. D	City health officer.
Bennington	*Joseph M. Ayres	Health officer.
Burlington	E. F. Foster, M. D	City health officer.
Rutland	*Clare M. Cole	Health officer.
Virginia:		
Alexandria	*W. Lewis Schafer, M. D	Health officer and clinician.
Charlottesville	*George B. Young, M. D	Health officer.
Danville	*R. N. Garnett, M. D	Do.
Hopewell	L. A. Sims	City engineer.
Lynchburg	*Mosby G. Perrow, Ph. D	Director of public welfare.
Newport News	*G. Colbert Tyler, M. D	Health officer.
Norfolk	*J. Jett McCormick, M. D	Health commissioner.
Petersburg	Mason Romaine, M. D	Health officer.
Portsmouth	*Lonsdale J. Roper, M. D	Director of public welfare.
Richmond	*W. Brownley Foster, M. D	Director of public welfare and health officer.
Roanoke	*Coleman Bernard Ransone, M. D	Health officer.
Staunton	J. F. Fulton, M. D	Do.
Suffolk	*Challis Haddon Dawson, M. D	Director of health.
Winchester	L. M. Allen, M. D	Health officer.
Washington:		
Aberdeen	B. O. Swinehart, M. D	City health officer.
Bellingham		
Bremerton	D. H. Polk, M. D	Do.
Everett	Carl W. Stomberg	Do.
Hoquiam	Ruth E. Watkins, M. D	Do.
Longview	Geo. H. Coffin, M. D	City physician.
Olympia	Wayne L. Bridgeford, M. D	Health officer.
Port Angeles	Will H. Taylor, M. D	City health officer.
Seattle	*E. T. Hanley, M. D	Commissioner of health.
Spokane	*Ralph Hendricks, M. D	Commissioner of public affairs and health officer.
Tacoma	Samuel Morton Creswell, M. D	Director of health.
Vancouver	*Geo. H. T. Sparling, M. D	County and city health officer.
Walla Walla	*Jerry E. Vanderpool, M. D	Do.
Wenatchee	*Paul L. West, M. D	Health officer.
Yakima	*Lloyd Moffitt, M. D	County health officer.
West Virginia:		
Bluefield	*David B. Lepper, M. D., C. P. H.	City health director.
Charleston	Hugh B. Robins, M. D	Health commissioner.

City	Name of health officer	Official title
West Virginia—Continued.		
Clarksburg	*J. E. Stephenson, M. D	City health officer.
Fairmont	*J. A. Jamison, M. D	Do.
Huntington	*W. M. York, M. D	Do.
Martinsburg	*Edwin Cameron, M. D	Health commissioner.
Morgantown	*H. H. Pierce, M. D	City health officer.
Moundsville	*W. G. C. Hill, M. D	County and city health officer.
Parkersburg	*Arthur D. Knott, M. D., D. P. H.	Do.
Wheeling	*William Hay McLain, M. D	Do.
Wisconsin:		
Appleton	Frank P. Dohearty, M. D	Health officer.
Ashland	C. O. Hartzman, M. D	Health commissioner.
Beloit	*Clifford W. Andrews, M. D	Health officer.
Cudahy	Bernard Krueger, M. D	Do.
Eau Claire	L. H. Flynn, M. D	Do.
Fond du Lac	*G. B. McKnight, M. D	Do.
Green Bay	*Henry S. Atkinson, M. D	City physician and health commissioner.
Janesville	Fred B. Welch, M. D	City health officer.
Kenosha	*G. Windesheim, M. D	Director of health.
La Crosse	*Anthony M. Murphy	Acting health commissioner.
Madison	*F. F. Bowman, B. L., M. D	Health officer.
Manitowoc	George M. Hoffman, M. D	Health commissioner.
Marinette	J. Wm. Boren, M. D	Do.
Milwaukee	*John P. Koehler, M. D	Commissioner of health.
	E. V. Brumbaugh, M. D	Deputy commissioner of health.
School hygiene division	*George P. Barth, M. D	Director.
Division of venereal diseases.	*William J. McKillip, M. D	Do.
Vital statistics	*George E. Adams	Deputy registrar.
Division of tuberculosis	*George R. Ernst, M. D	Director.
Contagious disease division.	*Robert E. Hickey, M. D	Do.
Division of food and sanitary inspection.	*Stanley Pilgrim, M. D. C	Do.
Bureau of laboratories	*R. W. Cunliffe	Do.
Division of child welfare	*E. V. Brumbaugh, M. D	Do.
Division of nurses	*Alma Brunk, R. N	Do.
Oshkosh	*Edw. J. Campbell, M. D	Health commissioner.
Racine	*William Waldo Bauer, M. D	Health officer.
Sheboygan	*Gustav J. Hildebrand, M. D	Commissioner of public health.
Shorewood	Walter G. Darling, M. D	Commissioner of health.
South Milwaukee	O. C. Heyer, M. D	Health commissioner.
Stevens Point	F. R. Krembs, M. D	Health officer.
Superior	*Geo. Hall Conklin, M. D	Health commissioner.
Two Rivers	A. P. Zlatnik, M. D	Health officer.
Watertown	F. C. Haney, M. D	Health commissioner.
Waukesha	Frank M. Scheele, M. D	Do.
Wausau	*L. F. Bugbee	Health officer.
Wauwatosa	Enoch F. Peterson, Ph. G., M. D	Health commissioner.
West Allis	*Samuel C. McCorkle, M. D	Do.
Wyoming:		
Casper	Neil Chas. Geis, M. D	City physician.
Cheyenne	N. C. Nelson, M. D	City and county health officer.

DEATHS DURING WEEK ENDED NOVEMBER 14, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended November 14, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Nov. 14, 1931	Corresponding week, 1930
Policies in force	74, 289, 657	75, 288, 546
Number of death claims	12, 908	13, 480
Death claims per 1,000 policies in force, annual rate	9. 1	9. 3
Death claims per 1,000 policies, first 46 weeks of year, annual rate	9. 6	9. 6

Deaths [1] from all causes in certain large cities of the United States during the week ended November 14, 1931; infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Nov. 14, 1931				Corresponding week, 1930		Death rate [2] for the first 46 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,566	11.1	598	[4] 47	12.1	751	11.9	11.9
Akron	31	6.3	4	40	6.1	5	7.7	7.9
Albany [6]	35	14.1	5	99	15.5	6	13.9	14.8
Atlanta [6]	85	16.0	7	69	9.4	5	14.9	15.4
White	38	10.7	2	30	8.9	4	11.6	11.5
Colored	47	26.3	5	144	10.8	1	21.7	23.2
Baltimore [5] [6]	221	14.2	22	77	15.8	23	14.3	14.0
White	159	12.4	16	71	15.4	14	13.0	12.8
Colored	62	22.0	6	96	17.4	9	20.2	19.9
Birmingham [6]	49	9.5	3	30	15.5	11	13.2	13.7
White	24	7.5	3	51	11.3	5	10.1	10.1
Colored	25	12.7	0	0	22.5	6	18.2	19.4
Boston	183	12.2	15	43	14.3	26	14.2	14.1
Bridgeport	34	12.1	6	101	8.9	1	11.1	10.9
Buffalo	121	10.9	8	36	13.0	13	12.9	12.9
Cambridge	27	12.3	2	41	11.9	2	12.0	11.8
Camden	31	14.9	0	0	13.2	1	14.1	13.5
Canton	27	13.2	4	99	5.9	5	10.1	9.9
Chicago [5]	603	9.1	45	40	11.2	70	10.6	10.4
Cincinnati	143	16.3	19	114	19.1	11	15.9	15.6
Cleveland	176	10.1	19	55	9.7	15	11.1	11.1
Columbus	81	14.3	4	39	16.1	6	13.5	15.5
Dallas [6]	59	11.3	7		12.9	8	11.2	11.5
White	48	11.1	6		13.0	6	9.8	10.5
Colored	11	12.1	1		12.7	2	17.6	16.2
Dayton	40	10.1	5	71	12.9	7	11.8	10.7
Denver	70	12.5	3	30	17.3	14	13.8	14.9
Des Moines	24	8.7	4	76	10.6	1	11.0	11.7
Detroit	212	6.7	21	33	9.6	30	8.2	9.3
Duluth	23	11.8	3	81	12.8	2	11.2	11.4
El Paso	17	8.4	2		11.1	4	15.3	17.0
Erie	22	9.7	0	0	7.2	1	10.3	11.1
Fall River [5] [7]	25	11.3	6	142	10.9	0	11.1	11.7
Flint	16	5.1	2	25	6.9	6	6.9	9.2
Fort Worth [6]	32	10.0	2		8.6	2	10.7	10.8
White	31	11.5	2		8.3	1	10.3	10.3
Colored	1	1.9	0		9.9	1	12.5	13.5
Grand Rapids	25	7.6	1	15	9.9	2	9.0	10.2
Houston [6]	76	12.8	10		14.7	7	11.0	12.1
White	33	7.6	6		11.5	5	10.2	10.7
Colored	43	27.0	4		23.2	2	13.5	15.9
Indianapolis [6]	93	13.1	6	46	13.6	9	13.7	14.5
White	75	12.0	6	53	13.0	5	13.2	13.5
Colored	18	20.8	0	0	17.7	4	17.2	21.6
Jersey City	67	11.0	1	9	13.6	6	11.3	11.3
Kansas City, Kans. [6]	25	10.6	4	88	12.8	4	12.6	11.7
White	18	9.4	4	107	9.5	3	11.9	11.0
Colored	7	15.5	0	0	27.3	1	15.6	15.0
Kansas City, Mo.	98	12.5	6	48	12.6	9	13.0	13.2
Knoxville [6]	28	13.4	2	43	19.6	3	12.4	13.6
White	26	14.8	1	24	18.1	3	11.6	12.8
Colored	2	5.9	1	191	27.1	0	16.4	18.0
Long Beach	41	14.0	3	75	10.9	0	9.9	9.9
Los Angeles	260	10.3	20	58	11.1	23	10.6	11.0
Louisville [6]	46	7.8	1	9	14.6	9	13.9	13.6
White	40	8.0	1	10	13.0	9	12.5	12.1
Colored	6	6.6	0	0	23.1	0	21.6	21.7
Lowell [7]	18	9.3	3	78	14.5	3	12.7	13.4
Lynn	18	8.1	1	29	12.2	1	9.4	10.4
Memphis [6]	69	13.9	7	74	18.5	9	16.6	17.0
White	36	11.7	4	67	15.3	4	13.5	13.3
Colored	33	17.4	3	87	23.7	5	21.4	23.1
Miami [6]	26	12.1	3	77	13.2	4	11.7	10.9
White	21	12.6	2	72	12.2	2	10.8	9.6
Colored	5	10.3	1	91	16.6	2	14.9	15.3

See footnotes at end of table.

Deaths[1] *from all causes in certain large cities of the United States during the week ended November 14, 1931; infant mortality, annual death rate, and comparison with corresponding week of 1930.*—Continued

City	Week ended Nov. 14, 1931				Corresponding week, 1930		Death rate[2] for the first 46 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Milwaukee	86	7.6	7	31	7.6	7	9.2	9.6
Minneapolis	87	9.6	11	71	9.8	18	11.1	10.7
Nashville[6]	53	17.8	6	90	12.5	4	16.8	16.5
White	35	16.2	4	79	11.2	3	14.4	13.9
Colored	18	21.9	2	126	15.8	1	23.1	23.2
New Bedford[7]	27	12.5	3	79	10.7	3	12.1	11.0
New Haven	42	13.5	3	46	14.7	3	12.5	12.8
New Orleans[6]	148	16.5	15	84	18.0	14	16.7	17.3
White	91	14.3	10	84	14.8	6	13.6	14.3
Colored	57	22.1	5	83	26.1	8	24.5	24.9
New York	1,441	10.6	101	43	10.6	119	11.1	10.8
Bronx Borough	206	8.1	10	28	7.5	8	8.1	7.9
Brooklyn Borough	453	9.0	36	38	9.8	48	10.2	9.8
Manhattan Borough	586	16.8	44	59	15.8	47	16.7	16.0
Queens Borough	160	7.2	11	44	7.7	14	7.2	7.1
Richmond Borough	36	11.5	0	0	10.5	2	13.6	14.0
Newark, N. J.	70	8.2	3	18	14.7	18	11.5	12.0
Oakland	65	11.6	3	38	9.7	3	10.5	10.9
Oklahoma City	35	9.3	7	98	10.0	5	10.7	10.6
Omaha	54	13.0	4	46	13.1	5	13.8	13.5
Paterson	31	11.6	4	68	7.9	4	13.3	12.1
Peoria	29	13.9	1	26	11.4	2	12.5	12.3
Philadelphia	447	11.9	34	49	13.2	48	12.9	12.6
Pittsburgh	191	14.7	11	38	14.7	13	14.4	13.8
Portland, Oreg.	53	9.0	4	49	14.1	2	11.6	12.1
Providence	57	11.7	6	55	13.6	4	12.6	12.9
Richmond[6]	50	14.1	2	29	16.5	4	15.4	14.9
White	27	10.7	2	44	14.4	3	13.0	12.1
Colored	23	22.7	0	0	21.6	1	21.5	21.5
Rochester	72	11.3	7	64	14.9	10	11.8	11.7
St. Louis	215	13.5	10	36	11.6	13	14.9	14.1
St. Paul	41	7.7	2	21	11.1	5	10.5	10.1
Salt Lake City[5]	44	16.1	6	90	17.4	9	12.1	12.5
San Antonio	56	12.2	5	-------	11.2	6	14.2	15.9
San Diego	35	11.7	0	0	12.9	1	13.4	14.3
San Francisco	127	10.2	3	20	10.5	2	13.0	12.9
Schenectady	20	10.8	0	0	12.5	4	10.7	11.2
Seattle	86	12.1	5	49	11.7	4	11.4	10.8
Somerville	15	7.4	1	31	13.0	3	8.8	9.7
South Bend	25	12.1	2	52	7.0	0	8.1	8.9
Spokane	30	13.4	0	0	11.7	2	12.4	12.5
Springfield, Mass.	34	11.6	2	34	12.8	2	11.6	12.1
Syracuse	51	12.5	8	98	9.9	5	11.6	11.6
Tacoma	25	12.1	1	28	15.6	1	12.2	12.6
Toledo	80	14.1	7	66	15.0	11	11.9	12.7
Trenton	29	12.2	1	18	11.4	6	16.3	16.5
Utica	37	18.9	0	0	12.8	0	14.2	14.8
Washington, D. C.[6]	153	16.2	11	61	17.1	11	15.9	15.1
White	98	14.4	6	49	15.0	5	13.6	13.0
Colored	55	21.2	5	85	22.7	6	21.9	20.9
Waterbury	31	16.0	4	100	8.9	1	9.7	9.4
Wilmington, Del.[7]	26	12.7	2	45	20.1	5	13.9	14.4
Worcester	38	10.0	4	57	14.4	6	12.0	12.7
Yonkers	27	10.1	2	48	6.2	3	8.3	8.0
Youngstown	25	7.5	4	55	13.8	4	9.9	10.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 77 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 29; Richmond, 29; and Washington, D. C., 27.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended November 21, 1931, and November 22, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 21, 1931, and November 22, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 21, 1931	Week ended Nov. 22, 1930	Week ended Nov. 21, 1931	Week ended Nov. 22, 1930	Week ended Nov. 21, 1931	Week ended Nov. 22, 1930	Week ended Nov. 21, 1931	Week ended Nov. 22, 1930
New England States:								
Maine	2	5	1		147	20	0	0
New Hampshire		7			5		0	0
Vermont	5	2			41	1	0	0
Massachusetts	59	74	9	6	127	161	3	1
Rhode Island	3	12		1	126	1	0	0
Connecticut [1]	4	21	8	3	17	91	0	2
Middle Atlantic States:								
New York	106	93	[2] 9	[2] 14	199	192	9	5
New Jersey	41	65	9	12	45	130	1	4
Pennsylvania	159	152			319	208	4	3
East North Central States:								
Ohio	90	49	4	3	78	15	1	2
Indiana	97	61	5	11	18	121	1	0
Illinois	123	190	5	9	34	146	6	4
Michigan	56	188	1	5	24	44	2	8
Wisconsin	16	27	15	36	22	182	2	0
West North Central States:								
Minnesota	28	24	2		36	10	0	2
Iowa	19	19			1	4	0	0
Missouri	92	61	3	8	20	393	0	6
North Dakota	6	2				8	0	1
South Dakota	16	6			52	1	0	0
Nebraska	20	9	2	8	6	12	0	3
Kansas	87	15		1	19	7	1	3
South Atlantic States:								
Delaware	36	5	4		2	1	0	0
Maryland [3]	78	35	14	17	7	12	2	0
District of Columbia	17	15	2	3	3	6	0	1
Virginia							1	
West Virginia	55	25	16	23	110	18	0	0
North Carolina [1]	167	101	35	10	86	12	1	2
South Carolina	34	47	452	550	14		0	5
Georgia [1]	36	15	45	72	3	10	7	1
Florida	26	27	1	2	4	18	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 21, 1931, and November 22, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 21, 1931	Week ended Nov. 22, 1930	Week ended Nov. 21, 1931	Week ended Nov. 22, 1930	Week ended Nov 21, 1931	Week ended Nov. 22, 1930	Week ended Nov. 21, 1931	Week ended Nov. 22, 1930
East South Central States:								
Kentucky	143	22					4	1
Tennessee	152	72	26	11	2	21	5	4
Alabama [1]	102	87	47	55	6	53	5	4
Mississippi	79	64					1	2
West South Central States:								
Arkansas	56	18	9	32	21		0	1
Louisiana	59	46	6	12	6	2	2	4
Oklahoma [4]	101	73	20	47	31	38	0	1
Texas	115	67	11	12	2	26	1	0
Mountain States:								
Montana	4	7			60	1	1	0
Idaho	9					6	0	1
Wyoming					1		0	0
Colorado	4	20			4	48	1	2
New Mexico	31	6				16	1	2
Arizona	10	4	2		1	34	0	1
Utah [3]	2	2	10	7	3		1	3
Pacific States:								
Washington	13	32			28	33	0	0
Oregon	4	5	28	13	12	57	0	0
California	110	66	72	31	181	117	4	5

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov 21, 1931	Week ended Nov. 22, 1930	Week ended Nov. 21, 1931	Week ended Nov. 22, 1930	Week ended Nov. 21, 1931	Week ended Nov 22, 1930	Week ended Nov. 21, 1931	Week ended Nov. 22, 1930
New England States:								
Maine	1	3	25	17	0	0	2	17
New Hampshire	2	0	2	4	0	0	0	0
Vermont	4	0	5	13	8	1	0	0
Massachusetts	14	9	237	172	0	0	7	11
Rhode Island	0	0	19	6	0	0	0	3
Connecticut [1]	3	1	58	38	0	0	1	4
Middle Atlantic States:								
New York	42	11	385	409	3	25	21	33
New Jersey	13	0	143	144	0	0	7	8
Pennsylvania	14	5	403	520	0	1	64	40
East North Central States:								
Ohio	5	18	397	351	14	55	27	38
Indiana	0	2	106	204	6	73	11	4
Illinois	17	6	306	326	23	36	25	32
Michigan	6	4	228	210	4	41	16	15
Wisconsin	14	5	72	172	14	9	1	5
West North Central States:								
Minnesota	20	8	31	75	1	8	1	7
Iowa	5	14	55	50	33	13	6	5
Missouri	1	9	77	88	8	12	14	21
North Dakota	0	1	24	17	30	5	3	1
South Dakota	0	4	8	10	20	6	3	2
Nebraska	2	15	19	33	1	12	2	1
Kansas	0	10	51	47	8	24	7	7
South Atlantic States:								
Delaware	0	0	10	13	0	0	0	4
Maryland [3]	2	3	126	82	0	0	27	30
District of Columbia	0	0	27	37	0	0	5	1
Virginia								
West Virginia	0	2	50	63	1	32	37	28
North Carolina [1]	3	0	203	120	0	0	5	6
South Carolina	2	2	16	23	0	1	11	24
Georgia [1]	0	0	40	35	0	0	16	18
Florida	0	0	9	7	2	1	0	1

[1] Typhus fever, 14 cases: 1 case in Connecticut, 2 cases in North Carolina, 5 cases in Georgia, and 6 cases in Alabama.
[2] New York City only.
[3] Week ended Friday.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa and for 1930 are exclusive of Tulsa only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 21, 1931, and November 22, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 21, 1931	Week ended Nov 22, 1930	Week ended Nov. 21, 1931	Week ended Nov 22, 1930	Week ended Nov. 21, 1931	Week ended Nov. 22, 1930	Week ended Nov. 21, 1931	Week ended Nov. 22, 1930
East South Central States:								
Kentucky	0	1	102	71	12	0	31	16
Tennessee	0	0	87	53	8	2	24	15
Alabama [1]	1	2	55	112	1	0	19	8
Mississippi	0	0	36	39	9	0	10	18
West South Central States.								
Arkansas	1	2	35	30	0	3	14	25
Louisiana	0	3	41	15	1	5	28	25
Oklahoma [4]	1	2	39	65	10	13	32	23
Texas	0	7	50	41	9	3	17	32
Mountain States:								
Montana	0	0	34	22	0	6	2	1
Idaho	0	0	8	4	1	0	2	1
Wyoming	0	4	5	9	0	0	0	0
Colorado	0	1	23	27	2	7	4	10
New Mexico	0	3	9	3	1	0	12	5
Arizona	0	1	4	5	0	0	1	0
Utah [3]	0	0	15	5	0	0	0	1
Pacific States:								
Washington	2	1	43	44	9	30	7	5
Oregon	0	1	20	18	22	15	3	8
California	5	24	134	94	3	18	14	10

[1] Typhus fever, 14 cases: 1 case in Connecticut, 2 cases in North Carolina, 5 cases in Georgia, and 6 cases in Alabama.
[3] Week ended Friday.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa and for 1930 are exclusive of Tulsa only.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September, 1931										
Hawaii Territory	4	16			28		4	6	0	2
October, 1931										
Alabama	7	557	20		31	36	1	304	9	128
California	18	338	223	14	442	1	26	461	28	54
Idaho	3	16			8		4	60	4	17
Illinois	21	402	85	158	85	3	192	795	34	172
Louisiana	4	164	22	101	18	26	3	83	4	139
Maryland	3	302	39	4	33		15	311	0	188
Michigan	14	156	2	3	132		232	491	22	70
Minnesota	9	102	3		25		213	180	5	22
Missouri	8	470	11	51	24	1	21	363	18	121
New Jersey	5	118	25		50		143	326	0	36
New Mexico		88	1	19	1		5	34	1	53
New York	27	318			296		772	886	26	176
Ohio	16	734	46	4	152		39	1,438	16	223
Rhode Island		18			235		14	55	0	3
South Carolina		310	1,145	2,276	29	242	4	90	7	114
Texas	4	225	29	733			5	167		150
West Virginia	6	437	90		229		18	319	1	305

September, 1931

	Cases
Hawaii Territory:	
Chicken pox	11
Conjunctivitis	93
Dysentery (bacillary)	1
Hookworm disease	77
Impetigo contagiosa	3
Leprosy	13
Mumps	4
Paratyphoid fever	3
Tetanus	2
Undulant fever	1

October, 1931

	Cases
Anthrax:	
Louisiana	1
New York	1
Beri-beri:	
California	1
Chicken pox:	
Alabama	57
California	512
Idaho	76
Illinois	292
Louisiana	1
Maryland	49
Michigan	253
Minnesota	212
Missouri	77
New Jersey	153
New Mexico	25
New York	412
Ohio	583
Rhode Island	12
South Carolina	45
West Virginia	59
Conjunctivitis:	
New Mexico	3
Dengue:	
South Carolina	7
Diarrhea:	
Maryland	57
South Carolina	585
Diarrhea and enteritis (under 2 years):	
Ohio	53
Dysentery:	
California (amebic)	24
California (bacillary)	24
Illinois	68
Illinois (amebic)	1
Illinois (bacillary)	9
Louisiana	3
Maryland	37
Minnesota	16
Minnesota (amebic)	2
Missouri	4
New Jersey	2
New York	33
Ohio	9
Food poisoning:	
California	13
Ohio	8
German measles:	
California	23
Illinois	10
Maryland	7
German measles—Continued.	
New Jersey	12
New Mexico	1
New York	81
Ohio	4
Rhode Island	2
South Carolina	2
Hookworm disease:	
Louisiana	12
South Carolina	130
Impetigo contagiosa:	
Maryland	223
Jaundice:	
California (epidemic)	2
Maryland	1
Lead poisoning:	
Illinois	4
New Jersey	3
Ohio	10
Leprosy:	
California	1
Lethargic encephalitis:	
Alabama	1
California	3
Illinois	4
New Jersey	1
New York	10
Ohio	4
South Carolina	5
Ludwig's angina:	
Illinois	2
Mumps:	
Alabama	63
California	351
Idaho	23
Illinois	101
Louisiana	1
Maryland	58
Michigan	136
Missouri	11
New Jersey	43
New Mexico	16
New York	232
Ohio	381
Rhode Island	9
South Carolina	66
Ophthalmia neonatorum:	
California	1
Illinois	4
Maryland	2
Missouri	3
New Jersey	3
New Mexico	1
New York	6
Ohio	63
Rhode Island	2
South Carolina	12
Paratyphoid fever:	
California	9
Illinois	4
New Jersey	1
New Mexico	1
New York	15
Ohio	1
South Carolina	7
Texas	3
West Virginia	1

Disease / State	Cases
Puerperal septicemia:	
Illinois	9
New York	11
Ohio	3
Rabies in animals:	
California	28
Illinois	8
Louisiana	5
Maryland	1
New York [1]	2
Rhode Island	1
South Carolina	10
Rabies in man:	
Illinois	1
Louisiana	1
Rocky Mountain spotted or tick fever:	
Maryland	1
Scabies:	
Maryland	11
Septic sore throat:	
California	3
Illinois	20
Louisiana	3
Maryland	2
Michigan	35
Missouri	18
New York	3
Ohio	102
South Carolina	10
Tetanus:	
California	3
Louisiana	5
Maryland	1
New York	6
Ohio	3
South Carolina	2
Trachoma:	
California	113
Illinois	2
Louisiana	2
Maryland	1
Minnesota	1
Missouri	86
New Jersey	1
New York	1
Ohio	1
Trichinosis:	
California	18
Illinois	2
New Jersey	3
New York	9
Ohio	1
Tularaemia:	
Illinois	1
Maryland	1
Typhus fever:	
Alabama	15
Louisiana	1
Maryland	1
New York	1
South Carolina	4
Undulant fever:	
California	9
Illinois	6
Louisiana	11
Maryland	3
Michigan	3
Minnesota	4
Missouri	8
New Jersey	7
New York	17
Ohio	12
South Carolina	2
Vincent's angina:	
Illinois	24
Maryland	21
New York [1]	74
Whooping cough:	
Alabama	58
California	363
Idaho	4
Illinois	894
Louisiana	16
Maryland	584
Michigan	809
Minnesota	77
Missouri	351
New Jersey	672
New Mexico	11
New York	1,117
Ohio	914
Rhode Island	9
South Carolina	91
West Virginia	140

[1] Exclusive of New York City.

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of October, 1931, by departments of health of States named to other State health departments

Disease	California	Connecticut	Illinois	Massachusetts	Minnesota	Missouri	New Jersey	New York
Chicken pox				1				
Diphtheria								1
Gonorrhea					3			
Malaria	1							
Poliomyelitis		1		1	7			1
Syphilis					3	1		
Tuberculosis	5		2		43			1
Typhoid fever		2			2		2	2

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 95 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,280,000. The estimated population of the 88 cities reporting deaths is more than 31,735,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended November 14, 1931, and November 15, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	2,588	1,733	
95 cities	611	554	960
Measles:			
45 States	1,825	1,773	
95 cities	314	572	
Meningococcus meningitis:			
46 States	72	96	
95 cities	32	34	
Poliomyelitis:			
46 States	241	268	
Scarlet fever:			
46 States	4,044	3,670	
95 cities	1,081	1,168	894
Smallpox:			
46 States	165	355	
95 cities	7	25	9
Typhoid fever:			
46 States	605	575	
95 cities	76	94	62
Deaths reported			
Influenza and pneumonia:			
88 cities	570	743	
Smallpox:			
88 cities	0	0	

City reports for week ended November 14, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	1	----------	0	0	0	1
New Hampshire:								
Concord	0	0	0	----------	0	0	0	0
Nashua	0	1	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	0	0	0
Burlington	2	0	1	----------	0	10	0	0
Massachusetts:								
Boston	13	30	11	8	2	2	10	15
Fall River	2	4	4	----------	0	0	1	1
Springfield	0	4	0	----------	0	0	13	1
Worcester	0	6	1	----------	0	1	53	6
Rhode Island:								
Pawtucket	0	1	0	----------	0	0	0	0
Providence	6	9	3	----------	1	96	2	6
Connecticut:								
Bridgeport	1	5	0	2	2	0	0	4
Hartford	1	4	1	1	1	0	3	6
New Haven	2	1	0	----------	0	0	11	2
MIDDLE ATLANTIC								
New York:								
Buffalo	32	12	8	----------	0	6	0	21
New York	55	136	70	7	9	24	24	148
Rochester	3	4	0	----------	0	5	2	0
Syracuse	6	2	0	----------	0	1	3	2
New Jersey:								
Camden	0	7	6	----------	0	0	2	2
Newark	11	14	3	6	0	0	4	4
Trenton	0	2	0	----------	0	0	2	2
Pennsylvania:								
Philadelphia	41	58	11	4	7	3	11	28
Pittsburgh	27	26	18	2	6	47	51	27
Reading	21	2	1	----------	0	0	0	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	7	11	6	2	0	1	0	4
Cleveland	68	32	9	9	0	5	74	11
Columbus	6	6	13	----------	0	1	0	0
Toledo	35	9	3	1	0	3	0	7
Indiana:								
Fort Wayne	1	4	6	----------	0	0	0	5
Indianapolis	39	11	2	----------	0	1	0	7
South Bend	----------	2	----------	----------	----------	----------	----------	----------
Terre Haute	4	2	1	----------	0	0	0	3
Illinois:								
Chicago	64	113	37	3	3	13	9	38
Peoria	8	----------	9	----------	0	0	0	3
Springfield	----------	1	----------	----------	----------	----------	----------	----------
Michigan:								
Detroit	25	62	45	1	0	1	4	10
Flint	14	4	1	----------	0	2	2	1
Grand Rapids	2	1	1	----------	0	0	2	0

City reports for week ended November 14, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	10	1	0	-----	0	0	7	0
Madison	7	0	1	-----	-----	0	13	-----
Milwaukee	36	16	2	-----	0	6	20	2
Racine	3	2	0	-----	0	0	17	0
Superior	2	1	0	-----	0	0	11	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	17	0	0	-----	0	0	0	1
Minneapolis	34	24	11	-----	0	2	19	6
St. Paul	28	9	2	-----	0	1	2	1
Iowa:								
Davenport	2	2	0	-----	-----	0	0	-----
Des Moines	0	2	5	-----	-----	1	0	-----
Sioux City	13	3	9	-----	-----	0	2	-----
Waterloo	2	0	0	-----	-----	0	0	-----
Missouri:								
Kansas City	23	8	9	-----	1	4	1	4
St. Joseph	2	1	19	-----	0	0	0	1
St. Louis	16	42	20	1	1	0	1	8
North Dakota:								
Fargo	4	0	0	-----	0	0	0	1
Grand Forks	0	0	0	-----	-----	0	0	-----
South Dakota:								
Aberdeen	12	0	0	-----	-----	49	0	-----
Sioux Falls	0	0	0	-----	-----	0	0	-----
Nebraska:								
Omaha	17	11	12	-----	0	0	0	4
Kansas:								
Topeka	0	2	1	1	0	0	0	1
Wichita	0	3	13	-----	0	2	1	3
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	3	0	-----	0	0	1	4
Maryland:								
Baltimore	17	24	8	4	1	2	27	0
Cumberland	0	0	0	-----	0	0	0	1
Frederick	0	1	0	-----	0	0	0	0
District of Columbia:								
Washington	4	17	4	-----	0	0	0	8
Virginia:								
Lynchburg	0	4	2	-----	0	0	1	1
Norfolk	0	3	7	-----	0	0	0	5
Richmond	0	19	24	-----	0	0	0	2
Roanoke	0	5	3	-----	0	0	0	0
West Virginia:								
Charleston	22	3	3	-----	0	0	1	2
Wheeling	4	1	0	-----	0	1	0	2
North Carolina:								
Raleigh	6	3	1	-----	0	0	0	1
Wilmington	1	0	1	-----	0	0	0	4
Winston-Salem	5	5	4	-----	0	0	0	1
South Carolina:								
Charleston	0	2	2	22	0	1	0	2
Columbia	0	1	1	-----	0	0	0	2
Greenville	6	-----	0	-----	0	0	0	0
Georgia:								
Atlanta	1	9	16	8	2	1	0	17
Brunswick	0	0	0	-----	0	0	4	0
Savannah	0	3	0	3	0	0	0	1
Florida:								
Miami	0	1	0	-----	0	23	0	1
Tampa	0	2	5	-----	0	0	3	1

City reports for week ended November 14, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria: Cases, estimated expectancy	Diphtheria: Cases reported	Influenza: Cases reported	Influenza: Deaths reported	Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
EAST SOUTH CENTRAL								
Kentucky:								
Covington	3	1	3	----------	0	0	0	2
Tennessee:								
Memphis	0	10	18	----------	0	0	1	5
Nashville	0	4	5	----------	0	0	0	8
Alabama:								
Birmingham	0	8	9	----------	0	0	0	8
Mobile	0	3	0	----------	0	0	0	1
Montgomery	1	3	4	1	----------	2	0	----------
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	1	1	8	----------	----------	0	0	----------
Little Rock	0	2	5	----------	0	0	0	1
Louisiana:								
New Orleans	0	14	13	3	0	0	0	0
Shreveport	8	2	0	----------	0	0	0	2
Oklahoma:								
Muskogee	4	4	12	----------	0	1	0	0
Texas:								
Dallas	3	20	22	1	1	1	0	2
Fort Worth	0	12	8	----------	0	0	0	4
Galveston	0	0	4	----------	0	0	0	1
Houston	0	8	11	----------	1	0	0	6
San Antonio	0	4	6	----------	0	0	0	4
MOUNTAIN								
Montana:								
Billings	----------	0	----------	----------	----------	----------	----------	----------
Great Falls	0	0	0	----------	0	0	0	1
Helena	0	0	0	----------	0	5	0	0
Missoula	0	0	0	----------	0	0	0	1
Idaho:								
Boise	1	0	0	----------	0	0	0	0
Colorado:								
Denver	54	11	7	----------	2	2	1	5
Pueblo	18	1	0	----------	0	0	0	1
New Mexico:								
Albuquerque	0	0	4	----------	0	0	1	1
Arizona:								
Phoenix	0	0	0	----------	0	0	0	3
Utah:								
Salt Lake City	70	3	0	----------	1	0	1	4
Nevada:								
Reno	0	0	0	----------	0	0	0	5
PACIFIC								
Washington:								
Seattle	79	5	9	----------	----------	24	16	----------
Spokane	1	2	0	----------	----------	0	0	----------
Tacoma	4	4	1	----------	1	1	12	0
Oregon:								
Portland	16	9	0	----------	0	2	8	3
Salem	1	0	0	1	0	0	0	0
California:								
Los Angeles	33	37	45	24	3	3	11	21
Sacramento	1	2	8	----------	0	38	0	3
San Francisco	21	14	2	3	1	3	0	5

City reports for week ended November 14, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
NEW ENGLAND											
Maine:											
Portland	2	0	0	0	0	0	1	0	0	5	13
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	13
Nashua	0	1	0	0	0	0	0	0	0	1	-------
Vermont:											
Barre	0	3	0	0	0	0	0	0	0	1	3
Burlington	1	0	0	0	0	0	0	0	0	0	3
Massachusetts:											
Boston	50	50	0	0	0	8	2	1	0	8	183
Fall River	3	7	0	0	0	2	0	0	0	1	25
Springfield	5	1	0	0	0	5	0	0	0	5	31
Worcester	10	15	0	0	0	1	0	1	1	5	-------
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	14
Providence	8	9	0	0	0	3	0	0	1	5	57
Connecticut:											
Bridgeport	5	2	0	0	0	0	0	0	0	3	34
Hartford	4	3	0	0	0	1	0	0	0	3	46
New Haven	2	2	0	0	0	1	0	1	0	1	42
MIDDLE ATLANTIC											
New York:											
Buffalo	19	31	0	0	0	4	0	2	1	9	118
New York	82	86	0	0	0	97	15	8	1	88	1,441
Rochester	5	34	0	0	0	2	0	0	0	7	70
Syracuse	5	14	0	0	0	1	0	0	0	13	51
New Jersey:											
Camden	3	9	0	0	0	0	0	0	0	0	34
Newark	10	5	0	0	0	10	0	0	0	39	75
Trenton	2	7	0	0	0	3	1	0	0	0	29
Pennsylvania:											
Philadelphia	55	64	0	0	0	21	5	1	1	123	447
Pittsburgh	36	43	0	0	0	8	1	3	1	27	191
Reading	1	0	0	0	0	0	0	0	0	1	22
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	16	34	0	0	0	8	1	3	0	0	143
Cleveland	27	52	0	0	0	11	1	0	0	117	176
Columbus	9	12	0	0	0	5	0	3	0	3	81
Toledo	10	7	0	1	0	7	1	0	0	26	80
Indiana:											
Fort Wayne	2	1	0	0	0	1	1	3	0	4	28
Indianapolis	13	9	1	0	0	3	0	2	0	7	-------
South Bend	4	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Terre Haute	3	1	-------	0	0	0	0	0	1	0	21
Illinois:											
Chicago	88	130	0	0	0	32	4	3	1	141	603
Peoria	-------	0	-------	0	0	0	-------	0	0	2	29
Springfield	2	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Michigan:											
Detroit	68	67	0	0	0	18	2	4	0	60	212
Flint	11	15	1	0	0	1	1	0	0	3	16
Grand Rapids	9	6	0	0	0	0	0	0	0	5	25
Wisconsin:											
Kenosha	1	1	0	0	0	0	0	0	0	0	7
Madison	2	1	0	0	-------	-------	0	1	-------	0	-------
Milwaukee	17	13	0	0	0	2	0	0	0	93	86
Racine	3	1	0	0	0	1	1	0	0	1	6
Superior	2	0	0	0	0	1	0	0	0	0	8

City reports for week ended November 14, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	1	0	0	0	0	0	0	0	0	23
Minneapolis	38	14	0	0	0	1	0	1	0	11	87
St. Paul	15	1	0	0	0	3	1	0	0	5	44
Iowa:											
Davenport	0	1	0	1			0	0		0	
Des Moines	7	7	1	0			0	0		0	21
Sioux City	2	5	0	0			0	0		1	
Waterloo	1	0	0	0			0	0		4	
Missouri:											
Kansas City	13	17	0	0	0	5	0	1	0	10	98
St. Joseph	3	1	0	0	0	0	0	1	0	0	11
St. Louis	35	17	0	0	0	12	3	4	1	37	215
North Dakota:											
Fargo	3	9	0	0	0	0	0	0	0	3	9
Grand Forks	1	0	0	0			0	0		0	
South Dakota:											
Aberdeen	1	6	0	0			0	0		3	
Sioux Falls	2	0	0	0			0	0		0	7
Nebraska:											
Omaha	5	5	1	2	0	2	0	0	0	5	54
Kansas:											
Topeka	3	2	1	0	0	0	0	0	0	1	16
Wichita	4	6	0	0	0	0	1	0	0	0	35
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	1	0	0	0	0	0	1	0	2	26
Maryland:											
Baltimore	16	24	0	0	0	12	3	6	1	114	221
Cumberland	0	8	0	0	0	0	0	0	0	0	12
Frederick	0	0	0	0	0	0	0	0	0	0	3
District of Col.:											
Washington	17	21	0	0	0	15	2	2	0	19	153
Virginia:											
Lynchburg	1	3	0	0	0	0	0	0	0	0	7
Norfolk	3	8	0	0	0	2	0	0	0	0	
Richmond	9	18	0	0	0	3	0	0	0	2	52
Roanoke	4	1	0	0	0	1	0	0	0	0	11
West Virginia:											
Charleston [1]	2	2	0	0	0	2	0	[1] 2	1	6	33
Wheeling	2	4	0	0	0	2	0	0	0	2	18
North Carolina:											
Raleigh	1	5	0	0	0	0	0	0	0	0	10
Wilmington	1	2	0	0	0	0	0	0	0	5	12
Winston-Salem	4	4	0	0	0	1	0	0	0	17	22
South Carolina:											
Charleston	1	8	0	0	0	2	1	3	0	1	32
Columbia	1	1	0	0	0	0	0	0	0	0	5
Greenville	1	0	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	7	14	0	0	0	3	0	3	1	1	85
Brunswick	0	0	0	0	0	0	0	0	0	0	3
Savannah	1	5	0	0	0	4	0	1	0	0	20
Florida:											
Miami	1	2	0	0	0	2	0	0	0	0	26
Tampa	1	0	0	0	0	1	0	0	0	0	16
EAST SOUTH CENTRAL											
Kentucky:											
Covington	3	11	0	0	0	1	0	0	0	0	14
Tennessee:											
Memphis	7	11	0	1	0	2	2	2	1	23	69
Nashville	3	0	0	0	0	4	2	2	0	3	53
Alabama:											
Birmingham	5	1	0	0	0	3	1	0	0	14	49
Mobile	1	6	0	0	0	1	0	0	0	0	17
Montgomery	1	5	0	0			0	0		0	

[1] 1 case nonresident.

City reports for week ended November 14, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	3	0	0	--------	--------	0	0	--------	3	--------
Little Rock	2	2	0	0	0	3	0	0	0	0	8
Louisiana:											
New Orleans	8	14	0	0	0	0	2	4	0	0	--------
Shreveport	2	2	0	0	0	1	1	0	0	1	39
Oklahoma:											
Muskogee	2	2	0	0	--------	--------	0	0	--------	1	--------
Texas:											
Dallas	8	10	1	0	0	2	1	3	1	8	59
Fort Worth	4	8	1	1	0	1	0	0	0	0	32
Galveston	0	1	0	0	0	0	0	0	0	0	14
Houston	3	4	0	1	0	6	0	0	0	2	76
San Antonio	1	0	0	0	0	7	0	0	1	0	56
MOUNTAIN											
Montana:											
Billings	0	--------	0	--------	--------	--------	0	--------	--------	--------	--------
Great Falls	2	4	1	0	0	0	0	0	0	0	5
Helena	0	3	0	0	0	0	0	0	0	0	4
Missoula	1	1	0	0	0	0	0	0	0	0	8
Idaho:											
Boise	0	1	0	1	0	0	0	0	0	0	5
Colorado:											
Denver	11	21	0	0	0	7	1	0	0	14	70
Pueblo	0	0	0	0	0	0	1	0	0	0	9
New Mexico:											
Albuquerque	1	2	0	0	0	3	0	2	0	0	7
Arizona:											
Phoenix	0	0	0	0	0	2	0	0	0	0	--------
Utah:											
Salt Lake City	3	6	0	0	0	1	1	0	0	3	44
Nevada:											
Reno	1	0	0	0	0	0	0	0	0	0	8
PACIFIC											
Washington:											
Seattle	8	14	1	0	--------	--------	1	1	--------	4	--------
Spokane	6	2	1	1	--------	--------	0	0	--------	0	--------
Tacoma	3	1	1	0	0	0	0	0	0	0	25
Oregon:											
Portland	7	4	2	0	0	0	1	1	0	7	53
Salem	0	0	0	0	0	0	0	0	0	0	--------
California:											
Los Angeles	21	27	0	0	0	19	1	0	0	9	260
Sacramento	3	0	0	0	0	1	0	0	1	0	29
San Francisco	13	5	0	1	0	9	1	4	0	3	134

City reports for week ended November 14, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	2	1	0	0	0	0	2	2	0
Fall River	0	1	0	0	0	0	0	0	0
Springfield	0	0	0	0	0	0	0	1	0
Worcester	0	0	0	0	0	0	0	0	1
Rhode Island:									
Providence	0	0	0	0	0	0	1	2	0
Connecticut:									
Hartford	0	0	0	0	0	0	0	0	1
New Haven	1	1	0	0	0	0	0	0	0
MIDDLE ATLANTIC									
New York:									
New York [1]	6	3	3	4	0	0	6	13	3
Rochester	1	0	0	0	0	0	1	0	0
New Jersey:									
Newark	0	0	0	0	0	0	0	4	0
Trenton	0	0	0	0	0	0	0	[2] 1	0
Pennsylvania:									
Philadelphia	0	0	0	0	0	0	0	5	0
Pittsburgh	1	0	0	0	0	0	0	1	0
Reading	0	1	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	1	0	0	0	0	1	1	0
Cleveland	1	0	1	0	0	2	1	2	0
Indiana:									
Indianapolis	1	1	0	0	0	0	0	0	0
Illinois:									
Chicago	2	0	0	0	0	0	2	7	0
Michigan:									
Detroit	0	0	1	0	0	0	1	2	0
Flint	0	1	0	0	0	0	0	1	0
Wisconsin:									
Superior	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	1	1
Minneapolis	1	1	0	0	0	0	0	8	0
St. Paul	1	0	0	0	0	0	0	7	1
Missouri:									
St. Louis	2	1	0	0	0	0	1	0	0
SOUTH ATLANTIC [1]									
Maryland:									
Baltimore	1	1	0	0	0	0	1	0	1
District of Columbia:									
Washington	2	0	0	0	0	0	0	0	0
West Virginia:									
Wheeling	0	1	0	0	0	0	1	0	0
North Carolina:									
Raleigh	1	0	0	0	1	0	0	0	0
Winston-Salem	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	3	1	0	1	0
Florida:									
Miami	0	0	0	0	0	1	0	0	0
EAST SOUTH CENTRAL									
Alabama:									
Birmingham	2	1	0	0	0	0	0	1	0
Montgomery	0	0	0	0	1	0	0	0	0

[1] Typhus fever, 5 cases: 1 case at New York City, N. Y.; 1 case at Atlanta, Ga.; and 3 cases at Savannah, Ga.

[2] Nonresident.

City reports for week ended November 14, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	3	0	0	0
Louisiana:									
New Orleans	3	2	0	0	0	0	0	0	0
Texas:									
Dallas	1	0	1	1	1	1	0	0	0
Fort Worth	0	0	0	0	0	1	0	0	0
MOUNTAIN									
Colorado:									
Denver	1	0	0	0	0	0	0	0	0
PACIFIC									
California:									
Los Angeles	2	0	0	0	1	1	0	1	0
San Francisco	0	0	1	1	0	0	0	1	1

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended November 14, 1931, compared with those for a like period ended November 15, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, October 11 to November 14, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930
98 cities	70	70	82	77	[2] 85	90	[3] 94	[4] 82	[5] 96	89
New England	46	70	87	106	63	92	84	85	50	82
Middle Atlantic	34	33	32	34	41	44	32	33	52	44
East North Central	61	91	74	105	82	130	97	109	[6] 76	128
West North Central	128	76	145	66	174	93	155	[4] 77	184	107
South Atlantic	170	100	223	106	146	116	182	86	146	120
East South Central	233	143	122	179	204	293	[7] 289	215	227	185
West South Central	101	118	142	80	162	101	203	199	233	160
Mountain	52	18	35	62	[2] 9	35	[8] 49	123	[9] 63	26
Pacific	47	87	76	101	92	67	[10] 104	93	127	63

MEASLES CASE RATES

	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930
98 cities	26	35	32	36	[2] 37	59	[3] 39	[4] 59	[5] 49	91
New England	70	48	180	75	115	138	161	128	238	172
Middle Atlantic	20	22	19	29	30	27	27	34	38	68
East North Central	13	14	18	16	18	18	18	16	[6] 19	17
West North Central	10	143	6	143	11	294	15	[4] 282	17	502
South Atlantic	14	8	10	14	12	20	12	48	10	26
East South Central	0	6	17	24	23	42	[7] 13	84	12	18
West South Central	10	3	24	3	17	0	27	0	24	0
Mountain	78	194	17	141	[2] 63	414	[8] 157	220	[9] 63	308
Pacific	96	57	69	18	125	24	[10] 109	24	135	32

SCARLET FEVER CASE RATES

	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930
98 cities	101	120	126	121	[2] 139	161	[3] 170	[4] 169	[5] 169	187
New England	137	162	195	157	142	213	202	225	221	276
Middle Atlantic	74	85	100	78	127	132	134	133	131	126
East North Central	139	177	140	171	161	218	239	231	[6] 212	287
West North Central	94	116	119	116	136	163	140	[4] 140	149	143
South Atlantic	124	126	156	162	158	166	190	158	239	154
East South Central	70	132	145	149	198	245	[7] 107	293	198	275
West South Central	41	73	57	70	47	66	95	91	122	118
Mountain	44	38	174	167	[2] 172	344	[8] 275	282	[9] 322	388
Pacific	110	51	141	89	133	47	[10] 127	95	96	99

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] Boise, Idaho, not included.
[3] Covington, Ky., Billings, Mont., Pueblo, Colo., and Spokane, Wash., not included.
[4] Waterloo, Iowa, not included.
[5] South Bend, Ind., Springfield, Ill., and Billings, Mont., not included.
[6] South Bend, Ind., and Springfield, Ill., not included.
[7] Covington, Ky., not included.
[8] Billings, Mont., and Pueblo, Colo., not included.
[9] Billings, Mont., not included.
[10] Spokane, Wash., not included.

Summary of weekly reports from cities, October 11 to November 14, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 —Continued

SMALLPOX CASE RATES

	Week ended—									
	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930
98 cities	1	2	2	2	[2] 2	3	[3] 2	[4] 2	[5] 1	4
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	0	4	0	2	1	1	0	4	[6] 0	2
West North Central	6	0	10	0	6	19	11	[4] 6	4	21
South Atlantic	0	0	4	0	0	0	0	0	0	0
East South Central	6	0	0	0	0	0	[7] 13	0	6	0
West South Central	0	3	3	7	0	3	3	7	3	3
Mountain	9	26	0	0	[2] 0	9	[8] 0	9	[9] 9	0
Pacific	2	0	12	18	12	14	[10] 4	6	4	18

TYPHOID FEVER CASE RATES

	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930
98 cities	18	16	22	17	[2] 16	14	[3] 12	[4] 11	[5] 12	15
New England	10	10	29	29	5	5	10	5	7	24
Middle Atlantic	16	10	24	12	11	9	11	5	6	4
East North Central	8	7	12	5	16	7	6	9	[6] 11	5
West North Central	33	15	19	8	19	14	21	[4] 4	13	19
South Atlantic	49	62	26	40	38	32	30	32	36	34
East South Central	52	42	105	84	6	102	[7] 19	24	23	48
West South Central	41	21	37	24	17	14	30	28	24	87
Mountain	9	35	17	79	[2] 0	0	[8] 10	18	[9] 0	26
Pacific	4	22	6	16	25	18	[10] 6	16	10	10

INFLUENZA DEATH RATES

	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930
91 cities	5	5	4	5	[2] 5	9	[11] 7	9	[5] 8	9
New England	2	7	2	2	10	2	12	2	14	5
Middle Atlantic	6	4	2	6	4	9	8	12	10	8
East North Central	2	4	3	3	6	6	5	6	[6] 2	9
West North Central	0	3	3	9	0	9	6	3	6	6
South Atlantic	0	6	10	4	4	18	4	10	6	6
East South Central	6	0	13	6	6	13	[7] 0	26	0	39
West South Central	14	7	17	7	0	21	17	14	7	28
Mountain	35	9	9	9	[2] 18	18	[8] 20	9	[9] 27	9
Pacific	5	7	7	7	2	2	5	7	12	5

PNEUMONIA DEATH RATES

	Oct. 17, 1931	Oct. 18, 1930	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930
91 cities	64	72	69	86	[2] 82	99	[11] 87	101	[5] 86	115
New England	75	87	50	99	90	104	67	89	101	114
Middle Atlantic	63	70	78	102	96	109	107	116	106	129
East North Central	45	50	52	52	63	87	64	74	[6] 50	85
West North Central	100	54	91	60	75	96	80	87	88	78
South Atlantic	87	96	67	136	113	134	117	152	97	172
East South Central	69	162	95	84	101	65	[7] 123	136	151	188
West South Central	59	82	97	125	86	103	66	110	55	103
Mountain	87	194	78	79	[2] 54	167	[8] 128	194	[9] 152	220
Pacific	65	65	55	60	46	32	53	42	70	67

[2] Boise, Idaho, not included.
[3] Covington, Ky., Billings, Mont., Pueblo, Colo., and Spokane, Wash., not included.
[4] Waterloo, Iowa, not included.
[5] South Bend, Ind., and Springfield, Ill., not included.
[6] South Bend, Ind., Springfield, Ill., and Billings, Mont., not included.
[7] Covington, Ky., not included.
[8] Billings, Mont., and Pueblo, Colo., not included.
[9] Billings, Mont., not included.
[10] Spokane, Wash., not included.
[11] Covington, Ky., Billings, Mont., and Pueblo, Colo., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended November 7, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended November 7, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]					
Nova Scotia		2			
New Brunswick			1		1
Quebec			29		32
Ontario	1	1	6	3	37
Manitoba	1				3
Saskatchewan	1			1	1
Alberta			1	2	2
British Columbia			2	1	
Total	3	3	39	7	76

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended November 7, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended November 7, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	62	Puerperal fever	1
Diphtheria	94	Scarlet fever	78
Erysipelas	1	Tuberculosis	26
Measles	84	Typhoid fever	32
Mumps	21	Whooping cough	21
Poliomyelitis	29		

LATVIA

Communicable diseases—September, 1931.—Cases of certain communicable diseases were reported in Latvia during the month of September, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	3	Mumps	51
Diphtheria	53	Poliomyelitis	5
Dysentery	7	Scarlet fever	43
Erysipelas	27	Tetanus	2
Influenza	64	Trachoma	52
Leprosy	1	Typhoid fever	141
Lethargic encephalitis	1	Whooping cough	47
Measles	6		

VIRGIN ISLANDS

Communicable diseases—October, 1931.—During the month of October, 1931, cases of certain communicable diseases were reported in the Virgin Islands as follows:

	Cases
St. Thomas and St. John:	
Gonorrhea	5
Syphilis	1
Tuberculosis	4

	Cases
St. Croix:	
Dengue	2
Gonorrhea	1
Pellagra	1
Syphilis	2
Tuberculosis	1

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931		
							5	12	19	26	3	10	17	24	31	7	14	21
Ceylon: Colombo	C	1	1		3													
	D	1	1		3													
China:																		
Canton	C	2	1			1	1											
	D	1																
Shanghai	C			1	7	1	58	30	36	35	29	17	17	8				
	D						3	4	2	5	8			4				
Swatow	C		10	7														
Tientsin	C	1	10															
	D	1	1															
India	C	13,604	18,001	22,074	36,514	10,734	9,834	9,740	8,915	7,552	10,172							
	D	7,270	10,337	12,093	20,276	6,044	5,518	5,321	4,800	3,716	4,808							
Bombay	C			23	44	27	5	5	5	1	1	2		4	1			
	D			16	25	9	5	2	1		1	2			1			
Calcutta	C	265	292	237	110	10	3	15	18	18	23	3	7	14				
	D	149	168	155	30	4	2	3	6	6	12		5	9				
Chittagong	C												1					
Karikal	C	12			1	1			1	1								
	D	7			1	1			1									
Madras	C	52	9	4	6	3	1	1										
	D	17	4															
Moulmein	C			1														
	D			1														
Negapatam	C					1												
Rangoon	C	2	4	4	1					1				1				
	D	1	2	1	1					1				1				
Vizagapatam	C		1															
India (French):																		
Chandernagor	C	4	3	5	7		1	1		1								
	D	4	3	1	7		1	1		1								

Pondicherry	C	17	3	3	3	2			2		1							
	D	7	3	3	2	1			1									
India (Portuguese)	C		1	2	2	1	2	25	6		17	19						
	D			1	2	1	1	10	6		10	4						
Indo-China (see also table below):																		
Cochin-China—Rachgia	C				P													
Pnompenh	C		1	5	2			1	1		1					2	2	
	D	2	1	2	1			1	1		1							
Saigon and Cholon	C	104	61	14								1						
	D	76	41	7								1						
Iraq:																		
Abulkhasib	C					6												
	D					5												
Amara	C				2	22	35	8	1			2	2	2			3	3
	D				1	21	30	7	1				1	1			2	4
Amara Province	C					6	11	106	73	32	21	15	27	13	7	15		
	D					5	4	67	44	29	24	14	17	10	6	8		
Basra	C				547	148		54	91	77	19	29	32	38	30	9	1	
	D				287	76		30	48	34	11	13	26	7	18	10	1	
Basra Province	C				5	14	6	10	23	26	14	1	1	3	7			
	D				2	10	3	7	10	9	8	1	1	1	4			
Dinwaniyah	C									1								
Dinwaniyah Province	C									15	8	14	24	22	1			
	D									11	6	5	22	10	5			
Iwaniyah	C									22								
	D									15								
Muntafiq Province	C					10	21	66	128	55	54	45	55	17	19	9	23	1
	D					8	20	42	75	38	57	28	37	10	18	6	17	3
Nesiriyah	C						22	50	16	4	4	18	7	4	7	6	7	2
	D						15	40	20	3	4	18	3	3	6	3	6	
Suqelshuyukh	C					2												
	D					2												
Japan: Taiwan—Kelung	C															2		
Persia: [1] Rafsanjan [2]	C	36																
	D	14																
Philippine Islands [3] Provinces—																		
Capiz	C	17	4				9	9	17	49	21	5	4		7	5		
	D	15	4				5	6	5	35	16	5	3		5	4		
Cebu	C				3													
	D				3													
Iloilo	C		26	27														
	D		21	25														
Negros, Occidental	C		2															
	D		1															
Pampanga	C	1																
Siam	C	14	4	3	1	1												
	D	5	2	1		1												
Bangkok	C	3	1	4	1	1												
	D	1	1	2														

[1] On Oct. 23, 1931, cholera was reported at Mohammerah, Abadan, and Ahwaz, Persia. During the period from Oct. 22 to Nov. 7, 1931, 141 cases and 97 deaths were reported. The diagnosis of cholera was not confirmed upon bacteriological examination.

[2] From May 3 to 25, 1931, 152 cases of cholera with 75 deaths were reported in Rafsanjan and vicinity, Karman district, Persia.

[3] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug 22, 1931	Week ended— Aug. 29, 1931	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	11	21
On vessel:																		
S. S. Arankola, at Rangoon, from Calcutta	C	1																
S. S. City of Eastborne, at Calcutta, from Cocanada	C		1															
S. S. Tairea, at Penang, from Calcutta	C		1															
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C			1														
	D			1														
S. S. Kohistan, at Basra, from Bushire, Persia	C			2														
S. S. Cathay, at Kobe, Japan, from Shanghai	C				4													
	D				1													
S. S. Kasagi Maru, at Moji, from Shanghai	C						1											
S. S. Ankoo, at Nagasaki, from Shanghai	C							2										
	D							1										

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931: 1-10	11-20	21-31	August, 1931: 1-10	11-20	21-31	September, 1931: 1-10	11-20	21-30	October, 1931: 1-10	11-20
Indo-China (French) (see also table above):																
Cambodia [1]	C	100	113	117	308	72	82	87	12				8	6	1	16
	D	29	70	63	109			60	2				4	3	1	16
Cochin-China [1]	C	105	107	174	140	66	30	47	39				9	9	11	10
	D	73	74	133	106			42	32				6	7	2	2

[1] Reports incomplete.

PLAGUE

Place		May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931		
							5	12	19	26	3	10	17	24	31	7	14	21
Algeria:																		
Algiers	C				2													
Bone	C		1															
Philippeville	C			1	2													
	D			1	1													
Argentina: San Juan Province	C			P														
Belgian Congo	C		1															
	D		1															
British East Africa (see also table below):																		
Tanganyika	C	46	17	6	8				4	8	2							
	D	30	10	6	2				4	4								
Uganda	C	138	208	418	285	59	59	107	84	83	62							
	D	126	286	400	281	61	56	107	83	82	63							
Ceylon: Colombo	C	3	2	1	6		1	1	1	1	1	2						
	D	3	2	1	6		1	1	1	1	1	1						
Plague-infected rats		5			8													
China:[1]																		
Amoy	C	1																
	D	1																
Shansi Province[2]	C														P			
Shensi Province	C														P			
Dutch East Indies:																		
Batavia and West Java	C	59	116	75	58	19	18	8	20	21	31					1		
	D	59	66	75	58	19	18	8	20	21	31							
East Java and Madura	C	1																
	D	1																
Java and Madura	D	176	192	212	205	58	68	51	56	77	69	85	94					
Egypt:																		
Alexandria	C		4	13	9	2	2		1	1				1	1	3	1	
	D		4	5	3	1	1									1	1	1
Assiout	C	18	11															
	D	7	1															
Beni Suef	C	5																
	D	3																
Beheira	C						2											
Dakahlia	C			1	2													

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April. On September 19, 1931, 18 deaths were reported in Changchuanpu and new cases in Kaitung and Fengtien.
[2] On October 17, 1931, plague epidemic was reported in western Shansi Province, China, with 2,000 deaths at Hsinghsien.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 2-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931		
							5	12	19	26	3	10	17	24	31	7	14	21
Egypt—Continued.																		
Deirout	C	10	3															
	D	4	1															
Gharbieh	C		1															
	D		1															
Girga	C	7		1														
	D	2																
Kena	C	1																2
	D	1																1
Minieh	C	6	3	12												1	3	
	D	3	1	4												1	1	
Port Said	C		3	5	2									1			1	2
	D	1	2	1														2
Tanta	C				2		1		1									2
France. Rouen-Devilleles	C														P			
Hawaii Territory.																		
Hawaii—Hamakua—Plague-infected rats		1			1													
Maui Island—																		
Halimaile—Plague-infected rats									1									
Kula District	C				1													
	D				1													
Makawao—Plague-infected rats									1									
Paia—Plague-infected rats																		
Paauilo—Plague-infected rats															1			
India	C	752	88	221	684	282	337	554	659	723	527							
	D	692	51	128	440	146	179	238	209	355	222							
Bassein	C	1		4	2		1	2	1	1				1				
	D	1		3	2		1	2	1	1				1				
Bombay	C	8		12								1		1				
	D	6		6								1						
Plague-infected rats		94	37	48	47	23	17	7	10	9	9	12	12	4		11		
Burma	C			16														
	D			10														
Madras Presidency	C	2	6	21		9	73	88	114		62	3	90					
	D	1	1	9		4	51	52	55		16	1	59					
Moulmein	C			9		P	5											
	D			1			4	3	2	2								

Rangoon	C	2	1	2	1	2	1							5				
	D	2	1	1	1	1	1							1				
Plague-infected rats		7	3	6	3	1	1	1	1	1	1	1	1	1				
Indo-China (see also table below): Pnompenh	C		3															
	D		2															
Iraq:																		
Baghdad	C	23	23	3	1		2	1							1			1
	D	9	9	2			1											1
Maudhan	C	3														2	1	1
	D															1		1
Madagascar (see also table below): Tamatave	C				1			2		1								
Morocco	C									10			8	2	2			
	D												8		4			
Peru (see table below).																		
Senegal (see table below).																		
Siam	C	2	1		1	1	1	1	1	1	1	1						
	D	2	1			1	1		1	1	1							
Spain: Hospitalet—Barcelona Province	C				5	1			1	1	1			5		1	1	
	D				2				1		1			1				
Syria: Beirut	C			2	1			1	1	1	2					1		
Tunisia: Tunis	C	16	11					1				1						
	D	3	1															
Union of South Africa:																		
Cape Province—Plague-infected rats					1													
Orange Free State	C	2																
	D	2																

Place		May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931
British East Africa (see also table above):							
Kenya	C	245	154	484	235	14	19
Indo-China (see also table above)	C		2	1		1	3
	D		2	1		1	1
Madagascar (see also table above):							
Ambositra Province	C	19	15	1	2	1	
	D	18	15	1	1	1	
Antsirabe Province	C	7	12	13	22	19	
	D	7	12	12	22	19	
Miarinarivo Province	C	2		8	20	14	
	D	2		7	19	12	
Moramanga Province	C	2	1	1	3	12	
	D	2			3	11	
Tananarive Province	C	18	10	5	45	65	
	D	18	9	5	44	63	
Peru	C	2	5	3	19		
	D		1	2	14		

Place		May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931
Senegal:							
Baol [1]	C	4		27	101	13	6
	D	3		13	58	8	2
Dakar [1]	C	63	64	95	194	45	4
	D	49	56	73	106	31	4
Diourbel [1]	C					13	
	D					5	
Louga [1]	C	5	4	3	2	10	1
	D	2	2	1	1	4	2
Rufisque [1]	C	1	2	34	2	1	7
	D						1
Thies [1]	C		12	16	26	12	7
	D		3	7	16	8	5
Tivaouane [1]	C	19	3	3			
	D	11	2	2			

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14
Algeria:																				
Algiers	C	1	8	1																
Constantine	C	1		1						1										
Belgian Congo	C	47	42																	
Bolivia.[1]																				
Brazil: Porto Alegre (alastrim)	C	19	5	41	11	6	17		7	13	13	16	12	18						
	D			1	1				2		2			2						
British East Africa: Tanganyika	C	13	7	149	1	18			31	4	6	9			1,121					
	D			17							1	4			91					
British South Africa:																				
Northern Rhodesia	C			21			26													
Southern Rhodesia	C		1	2						1										
Canada:																				
Alberta	C			1		1							12				1	2	2	
British Columbia	C			2	2			3		1	1								1	
Manitoba	C		4									1								
Winnipeg	C										1									
Ontario	C	17	32	35	1		2	2	4		2		5	2	1	9		7	3	
Kingston	C									1										
Ottawa	C		1								1		5	2		1		4	3	5
Sault Ste. Marie	C	1																		
Toronto	C	1	1																	
Quebec	C			1																
Saskatchewan	C	48	54	42		10	6	10	8	8	12	5	1	6	3	1	11	3	1	
Regina	C	2											1			1				
Chile:																				
Antofagasta	C			1																
Chanaral	C	1																		
China:																				
Amoy	C	6	4	2	1						1		1			1			1	
	D	3	3	2	1						1		1							
Canton	C	3	1	2					1										1	
Foochow	C	P	P	P		P		P		P		P		P		P				
Hankow	C	5	4	3	1		1	1					1							

Hong Kong	C	1																		
	D	2																		
Manchuria—																				
Harbin (see also table below)	C	3																		
Kwantung—Dairen	C	2	1																	
Nanking	C	P				1														
Shanghai—																				
Foreigners only	C	7	11	3									35	29	17	17	1	6	2	
Including natives	D	7	13	6				1	1			1	5	8					1	
Tientsin	C	2		3																
Chosen (see table below).																				
Colombia:																				
Cali	D	1																		
Santa Marta	D										1									
Dutch East Indies:																				
Batavia and West Java	C	2																		
East Java and Madura	C	1																		
Eritrea	C	3		2					10											
	D								2											
France (see table below).																				
Great Britain:																				
England and Wales	C	570	287	187	26	25	19	21	33		19	45	45	41	34	41	39	42		
Bradford	C	8	5																	
Leeds	C	2																		
London	C	183	122	54	6	12	4	4	3	9	5	15	5	17	15	21	20	27		
London and Great Towns	C	403	228	152	22	20	17	10	13	30	11	34	35	31	25	37	31	37		
	D		1	1																
Sheffield	C										1	1								
Greece (see table below).																				
Honduras: Puerto Castilla	C													1						
India	C	11,403	7,313	5,359	978	904	645	400	483	484	409	329	382	528						
	D	1,849	1,704	1,352	234	213	179	120	144	108	109	72	100	122						
Bassein	C	1																		
Bombay	C	9	6	6	1		1			1	2	2								
	D	4	5	6	1					1										
Calcutta	C	89	47	21	4	4		5	2	1	2		1				1			
	D	75	41	18		4		5	2	1	2		1				1			
Cochin	C	3				1	1	1					1	1	2	4	3		2	
Karachi	C		2		1												1			
	D		1																	
Madras	C	8	2	2	1					1			1	5	6	1	2			
	D	6	1												2					
Negapatam	C		3	1'		2			3		1			1		1				
Rangoon	C	13	6	3	2		1	1	1		1			2		1			1	
	D	5	2	1	1			1			1			1	1					
Vizagapatam	C	6	6	5[1]		3		2	3	1	1	1	2	4			1			
	D	1	2	1		3		1	3	1	1	1		1			1			
India (French):																				
Chandernagor	C	7	1	3																
	D	5		2																

[1] An epidemic of smallpox was reported on May 18, with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931: 1	8	15	22	29	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14
India (French)—Continued.																				
Karikal	C	4	6	4	1	1	3	2		2	5			5		3			3	
	D	4	6	4	1	1	2	2		2	1			1		3			3	
Pondicherry Province	C	11	7	28	11	6		3	1	6	1	18	1	4	14	4				
	D	11	7	28	11	6		3	1	6	1	16	1	4	12	4				
India (Portuguese)	C	3																		
	D	1																		
Indo-China (see also table below):																				
Pnompenh	C	1	2																	
	D	1																		
Saigon and Cholon	C	2		3	1	1			1		3	2	1	4	1			4	2	
	D	1		1	1				1		2		1	2				4	1	
Iraq:																				
Baghdad	C	3	1								1									
	D	2																		
Basra	C	2	1																	
Mosul Liwa	C			1				1					5							
Ivory Coast (see table below).																				
Japan: Nagoya	C			1																
Mexico (see also table below).																				
Jalisco (State)—Guadalajara	D	2	1	3			2						1	1	2				2	
Mexico City and surrounding territory	C	45	25	22	8	2			2	2	1		2	1	2	2	1			
	D	11	13	8	1	1					1	1	1	2		1	1			
Monterrey	C		1															2		
Torreon	C	1	3							1	1			1						
	D		2								1									
Vera Cruz	C	1																		
Morocco (see table below).																				
Netherlands: Friesland—Opsterland	C																[1] 1			
Poland	C	3	3	18								1						1		
Portugal: Lisbon	C	67	48	45	17	12	8		10	21	18	17	16	11	6	15	19			
Rumania (see table below).																				
Siam	C	6	5	1							3									
	D	1	1	1																

Spain	C			7																
Straits Settlements	C	2				1														
	D	2																		
Sudan (Anglo-Egyptian)	C	6	1								32									
	D	2									6									
Syria (see table below).																				
Turkey (see table below).																				
Union of Socialist Soviet Republics (see table below).																				
Union of South Africa:																				
Cape Province	C	P																		
Natal	C							P			P									
Orange Free State	C	P	P	P			P	P	P	P			P	P	P					
Transvaal	C		P	P																
Upper Volta	C	88	12	2																
	D	1																		
On vessel:																				
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C							1												
S. S. Talodi at Suakin	C	1																		

Place		April, 1931	May, 1931	June, 1931			July, 1931			August, 1931			September, 1931			October, 1931	
				1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20
Indo-China (see also table above)	C	142	58	30	16	1	1		7	29				7	27	10	11
	D						1		4	11				4	8	3	3
Ivory Coast	C											7					
	D											4					
Syria: Beirut	C				1												

Place		February, 1931	March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931
China: Harbin (see also table above)	C		7		13	10		
Chosen	C		11		1	4	2	
	D		3				1	
France	C	16	15	6	51	9	20	
Greece	C	4			3	1		
Mexico (see also table above)	D	3		1	1	2		
Morocco	C	4	6	7.	49	48	23	23
Rumania	C		1		1			1

Place		February, 1931	March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931
Turkey	C	37	1		9	1		
	D	6						
Union of Socialist Soviet Republics	C		1,903	1,516	1,345			
Territories in Asia	C	532						
Ukraine	C	23						
Other territories in Europe	C	1,577						
Railroads, etc	C	77						

1 Imported case.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	Week ended— August, 1931					September, 1931				October, 1931					November
					1	8	15	22	29	5	12	19	26	3	10	17	24	31	7, 1931
Algeria:																			
Algiers	C	7	9	2												1		1	
Bono	C						1	1											
Constantine Department	C	22	26	3	1							2		1				11	
Oran	C	2	2			1				1									
Australia, Western	C	1																	
Bulgaria	C	16	30						1								1		
	D	4	6																
China:																			
Manchuria—Harbin	C		16						1										
Shanghai	C			3			1						1						
Chosen (see table below).																			
Colombia: Cali	D									1									
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C		3								1	1							
Cairo	C								1										
Gharbieh	C																		1
	D																		1
Great Britain: Scotland—Fife County	C	1																	
Greece (see table below).																			
Guatemala (see table below).																			
Iraq: Baghdad	C	2																	
	D	2																	
Irish Free State:																			
Cork County—																			
Schull	C			1															
Skibbereen	C		2	1															
Kerry County—																			
Dingle	C	1																	
Listowel	C		1																
Kildare County—Naas	C											1							
Limerick County—																			
Croom	C												1						
Glin	C										2		1						
Limerick	C			2	1														

Michelstown	C			1															
Rathkeale	C												1						
Mayo County—																			
Belmullet	C	1																	
Castlebar	C							1											
Westport	C							1											
Japan	C		1																
Lithuania (see table below).																			
Mexico (see also table below).																			
Durango	D			1															
Guadalajara	D							1											
Mexico City, including municipalities in Federal District	C	73	46	53	7	6		5	5	1	2	2	4	2	5	3	7		
	D	33	19	12	5	3		2	1	1		2	2	2	2	2	2		
San Luis Potosi	D	2		4				1											
Torreon	C			1											1	1		3	
	D			1											1	1		5	1
Morocco	C	42	101	102		2	1	5						1		3		1	
	D	4	6	8															
Palestine	C	4	5	2	3	3	1	4				4	4	1	1		2		1
Panama Canal Zone—Balboa	C	2																	
Poland	C	298	97	53	10	4	10	7	6	2	1	2	2	8	3	1	2	6	
	D	18	4	5	1		1							1				1	
Rumania	C	109	80	11	7	9	4	3		4	6	3	1	6					
	D	18	13	5		1		1				1							
Syria	C	4																	
Tunisia: Tunis	C	29	73	2					1		1	1							
	D	3	4																
Turkey (see table below).																			
Union of Socialist Soviet Republics (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P		P	P	P	P	P	P	P	P	P	P				
Municipality of East London	C		1		1														
Natal	C	P	P	P		P					1					P			
Orange Free State	C	P	P	12															
Transvaal	C	P	P	P		P	P	P	P	P	P	P	P	P	1				
Yugoslavia (see table below).																			

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Chosen: Seoul	C	3	4		6	1		
	D		1		1	1		
Czechoslovakia	C		5	11	2			
Greece	C	8	22	6	9	2	13	5
	D	1	3				2	
Guatemala	C				33	34	3	
	D				15	5		
Lithuania	C	99	34	10	13	8	2	
	D	3	5		2			

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Mexico (see also table above)	D	238						
Turkey	C	15	32	13	11	9		16
Union of Socialist Soviet Republics	C	2, 206	1, 513	1, 324				
Yugoslavia	C	10	43	14	2	3	1	
	D	1	5					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	September, 1931 12	September, 1931 19	September, 1931 26	October, 1931 3	October, 1931 10	October, 1931 17	October, 1931 24	October, 1931 31	November, 1931 7	November, 1931 14
Brazil:																	
Alagoas State	C				1												
	D				1												
Maceio	D															1	
Ceara State	C	1	1		1												
	D	1			1												
Minas Geraes State	C	2															
	D	1															
Rio de Janeiro State	C	2															
Sergipe State	C		1														
British Cameroons: Mamfe	C	3	2														
	D	2															
Colombia: Magdalena Province—Near Cienaga	C			4													
Gold Coast:																	
Akuse	C			2													
	D			1													
Dagomba District	C				4												
Kete Krachi	C											1					
Kintampo	C			1													
	D			1													
Oda	C								1								
	D								1								
Tamale	C			2						2				1			
	D			2						2							
Wale Wale	C				1												
	D				1												
Ivory Coast:																	
Bobo Dioulasso	C			1													
	D			1													
Grand Bassam	C				4			1									
	D				2			1									
Kong Circle	C			4													
Seguela	C				P												
Tehini	C															1	

Nigeria	C				1										1		1
	D				1												1
Senegal:																	
Podor (Hinterland)	C				1												
	D				1												
St. Louis	C									1							
Thies	C									1							
	D									1							
Sudan (French)	C			4													
Macina—Kayo Circle	C																2
Togo (French): Atakpame—Anie Circle	C															1	
	D															1	
Upper Volta:																	
Banfora	C			2						2							
	D			1						1							
Dedougou	C														2		
Diarabakoko	C									2							
	D									1							
Ouagadougou	C									1			1				

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Notes on the Fumigation of Vessels

Microscopic Examination for Intestinal Parasites

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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NOTES ON THE FUMIGATION OF VESSELS

PRELIMINARY INSPECTION, HOW RATS ESCAPE, INCREASED PERIODS OF EXPOSURE, AND OTHER MISCELLANEOUS NOTES[1]

By C. L. WILLIAMS, *Surgeon, United States Public Health Service*

It has been proved beyond the possibility of doubt that the mere release of a fumigant in an inclosed space does not insure penetration of the gas in lethal concentration into all retired locations and dead air spaces. Since these are the very places selected by rats as harborages, it follows that a fumigation conducted by mere release of the fumigant often fails to kill all of the rats. That this is true has been clearly demonstrated by an abundance of the most direct evidence—the appearance of live rats immediately following fumigations. In fact even when considerable pains have been taken to insure the penetration of the gas, the fumigation may fail (that is fall short of 100 per cent effectiveness), as the instances cited in another section will disclose.

Since the penetration of fumigant gases, in the short exposure periods used in ship fumigations, is probably dependent far more on internal air currents than on gaseous diffusion, it is apparent that to secure sufficient penetration, reasonably wide avenues for the air currents must be provided. There is only one way of doing this: Sufficiently large openings must be made into all inclosed spaces prior to fumigation.

Natural penetration, however, is not essential; instead, the gas may be injected directly into harborages. To do this, of course, it is first necessary to know where the harborages are located; and only preliminary inspection can disclose them.

SAVING OF EFFORT

The discovery of harborages is not the only function of preliminary inspection. Properly performed, this procedure provides the fumigating crew with specific information as to just where the rats are located, whether the infestation is general or local, and, if local, the

[1] This is the final paper of a series of articles dealing with the fumigation of vessels that have been published in Public Health Reports during the present year. These articles will be combined and issued as a single reprint.

location, extent, and character of the infested harborages. This knowledge saves labor, since it directs the application of intensive endeavor. A single illustration will make this clear. When a ship has a wood floor in the holds which is raised 2 inches above the steel tank tops, as is often the case, a fumigating crew has a choice of four procedures: It can raise boards in all holds and inject gas directly into each section between battens; it can satisfy itself by adequate inspection that rats are not utilizing the space under the floors and, hence, that direct fumigation or raising of the boards is not necessary; it can perform, without such preparation, a fumigation that may be quite ineffective; or it can remain in blissful ignorance. When rats infest space under such floors, only direct injection of the gas (or the removal of at least every third board) will certainly insure that the gas reaches them effectively.

The illustration is by no means extreme. A very large number of ships have such raised floors in the holds; and if the fumigators do not ascertain that the space beneath is rat-free, they must take adequate measures to insure effective gas penetration, or fail in their manifest duty. On the other hand, space below such floors is infested by rats in only about 5 per cent of all ships. In most cases, inspection will disclose these spaces to be free from rats; then they may be properly disregarded. A more familiar instance may be cited in regard to closed pipe casings. In a great many instances these may be determined at a glance to be uninhabited and, hence, the labor of opening is unnecessary.

In cold-storage spaces fumigation is a very uncertain process. Unguided by preliminary inspection of rat infestation, it is quite hopeless. One can not very well tear out all the insulation, and yet it is in this insulation that the rats are intrenched, and it is practically impervious to the gas. The only hope of complete success is to inject the gas directly into any existing rat burrows. To carry out such treatment the burrows must be located during preliminary inspection and prominently marked with chalk, since the fumigators, wearing gas masks which restrict the vision, can not take the time, while working the injection apparatus, to make a primary search for them.

INSPECTION PROCEDURE

By preliminary inspection of rat infestation it is not meant an inspection conducted some time in advance of fumigation, but one performed by the fumigators themselves as the first step of the fumigation. Only by observing conditions with their own eyes can the fumigators be perfectly aware of just what they are dealing with. However, it is not necessary that every member of the crew see all of a ship; in fact for inspection purposes each member may be assigned

a part of the vessel, reporting to the officer in charge, who should personally inspect any condition reported as unusual or difficult to treat. Small bits of preparatory work, such as opening one or two pipe casings, marking openings into insulation, etc., should generally be done while inspection is in progress; but for more extensive procedures, such as taking up boards from flooring, or opening numbers of pipe casings, it is better to call on the ship's crew. Since direct injection of gas involves changing the plan of fumigation, conditions necessitating such procedure should be reported to the officer in charge as soon as discovered.

Inspection consists primarily in searching for signs of rats, tracing these to the occupied harborages, and determining how they may best be treated. Details of inspection and details of fumigation treatment appear in other papers, already published or in process of publication.

HOW RATS ESCAPE FUMIGATION

Part of the experimental work conducted at the New York quarantine station consists of extensive opening and minute inspection of harborages following fumigation. This work has revealed in many specific instances the locations in which rats have managed to escape from the gas and pass through fumigation unscathed. Some of the specific instances will be cited, but it may first be stated that the highest degree of protection to rats is furnished by the insulation of cold storage spaces, into which rats burrow considerable distances. The burrows often terminate in dead ends, into which the gas seldom penetrates, and into many of which it has not as yet been successfully injected, even by use of compressed air. Next to insulation the best protection appears to be furnished by the space under raised wood floors in holds. Despite the fact that spaces beneath the floors in holds commonly open directly into the bilges, gas penetrates but poorly into them, this being true even when these spaces are relatively clear, though in greater degree when partly obstructed by dirt, collections of grain that have sifted through, and the like. Floors that are inclosed on the sides obviously are impenetrable to the gas unless boards are removed, or unless considerable cracks exist between planks.

Young rats exhibit a distinct tendency to burrow into the material of which nests are constructed and so may escape. Not infrequently new nests are built over old ones, so that there may be a considerable collection of litter under them. Sometimes nests are deeply placed in collections of boatswains' stores, particularly oakum or similar material.

The following are citations of instances of rats escaping fumigation:

S. S. "T".—A short pipe casing, covering a pipe leading from the top of a tank across the bottom of a hold, when pried up after fumigation, disclosed two live

rats at the closed end, shielded from gas by the body of a dead rat lying directly in the opening into the bilge.

S. S. "H".—An old passenger and cargo vessel had a large amount of all types of harborage occupied by a large and persistent rat colony. Following fumigation numerous live rats were discovered. In a locker full of boatswains' gear, five dead rats were found among the gear and one alive was found at the bottom. In a room nearby, also full of boatswains' gear, were six dead rats, but in a nest on the floor was one alive. A pipe casing, opened at the top before fumigation, was opened at the bottom after fumigation, disclosing a live rat. Investigation showed the casing nearly full of oakum through which rats had cut a single tortuous passage. Behind two large cargo gangplanks, lashed to the sides of the shelter deck, were three nests, all containing very young live rats. A long casing beside the keel was directly injected with liquid HCN at 10-foot intervals, but when opened later disclosed, besides a number of dead rats, four young ones alive in a nest hollowed out in the center of a mass of débris. A considerable collection of loose pig iron ballast under the shaft alley was directly fumigated with the air jet sprayer, but later, in its deeper recesses, were found two rats, unconscious but still breathing. This ship was fumigated with liquid HCN, the general fumigation being immediately preceeded by direct injection of the fumigant into all deep harborages.

S. S. "P. H."—In a large pipe casing were found two dead adult and four dead young rats, the latter in a nest; but in the packed débris below the nest were four more very much alive young rats which had literally "dug themselves in."

S. S. "M."—Direct fumigation of a long telegraph casing killed several rats therein, but failed to kill one in a small branch that opened into the sick bay.

S. S. "S."—Eight rats were fumigated in a small locker about 2 by 2 by 8 feet, built on the open deck against a deck house, which probably would have been entirely overlooked had not a fumigator seen a rat run across the deck and into the locker.

S. S. "R."—A peculiarly placed chain locker, built at the forward end of the lower forehold and accessible only through a flush manhole, closed with a wooden cover matching the flooring in the deck of the forecastle, was entirely overlooked during loaded fumigation. Subsequent fumigation when the ship was empty killed nine rats (and probably others under the chains) in this location.

S. S. "T."—Infested space under the fresh-water tanks was opened on two sides, but found packed with débris and loose grain literally honeycombed with rat runs. Gas was injected into all openings with the Zyklon pump just prior to general fumigation, but despite such treatment two live rats emerged to confront the fumigators while they were searching for dead ones.

S. S. "T."—Into the insulation of the cold storage room in the poop was directly injected 8 ounces of liquid HCN through several rat holes, the air jet sprayer being used. General fumigation immediately followed. Trapping for several days thereafter killed eight rats in the vicinity of this storeroom and none in any other part of the ship.

S. S. "C. L."—A tremendous rat colony in the poop, with its main harborage in the insulation of an ice box and among the food stores for an Indian crew, was attacked by the crew with sticks. About 150 rats were killed. A large number of the remaining rats scattered over the after part of the ship. The fumigating crew at Baltimore found them in many unusual locations, including the hawsers on the deck. These hawsers were covered with tarpaulins and fumigated, but many of the rats ran out as soon as they sensed the gas, and were killed by an alert fumigating crew.

S. S. "B."—This is a remarkable instance. Rats harboring, unsuspected, in a 6-inch steel conduit for electric cables, had escaped some twenty odd fumigations performed at 3 to 4 month intervals, in sufficient numbers to supply from 20 to 40 rats to each fumigation. A very careful inspection finally located the gas-proof retreat, and in the following fumigation gas was directly injected into it from the engine room. A fumigation three months later yielded just one rat, and several subsequent fumigations, as well as several inspections have demonstrated the vessel to be quite rat-free.

S. S. "F."—Rats were harboring under the raised wooden floors, and so, prior to fumigation, two or more boards were removed in each hold. Following fumigation, 78 dead rats were picked up and 14 live ones were seen, of which 10 were then killed. All the live rats were under the floors. Much better results would have been secured had gas been directly injected under the floors with the air jet sprayer.

S. S. "T."—All the rats on this vessel were under the raised wooden floors in holds. Boards were raised in all holds and gas was directly injected beneath the floors. This, followed by general fumigation, resulted in the recovery of 127 rats. In No. 1 hold, however, a live rat was found in a closed end against a bulkhead, at the extreme end of a rat run established through a collection of dirt and débris.

S. S. "D."—Following a very careful and painstaking fumigation of a cold-storage compartment, including direct injection of gas into rat burrows, searchers discovered a live rat which promptly ran up a pipe and disappeared through a hole that had been entirely overlooked. At the foot of the same pipe was a rat burrow into the insulated floor from which, when gas was injected, six rats emerged.

A STUDY OF INCREASED EXPOSURE

During the calendar year 1929, fumigation exposure time for HCN on all ships fumigated at the New York quarantine station was experimentally lengthened to three hours instead of the usual two hours.

During the first six months of this trial year the number of rats per fumigation definitely increased. During the second six months the number decreased. In the six months following the trial year, when the usual 2-hour exposure was resumed, the decrease progressed.

To determine whether these were real or only coincidental results (that is, dependent on general shipping conditions), a group of ships for which relatively complete records were available were segregated and tabulated in relation to previous and subsequent records and in relation to the periods in which fumigated. These appear in Table 1.

TABLE 1.—*Results of increasing period of exposure*

Group	Number of ships	Previous fumigation records, Jan. 1, 1927, to Dec. 31, 1928		First period, 3-hour exposure, Jan. 1, 1929, to June 30, 1929		Second period, 3-hour exposure, July 1, 1929, to Dec 31, 1929		Subsequent record, Jan. 1, 1930, to June 30, 1930		Comparison between subsequent and previous records—Rats per fumigation	
		Number of fumigations	Rats per fumigation	Number of fumigations	Rats per fumigation	Number of fumigations	Rats per fumigation	Number of fumigations	Rats per fumigation	Average increase	Average decrease
Ships fumigated in both 3-hour exposure periods	63	248	15	84	16	94	12	85	7		8
Ships fumigated in first 3-hour exposure period but not in second	15	43	18	18	24			16	15		3
Ships fumigated in second 3-hour exposure period but not in first	21	61	15			24	17	25	11		4
Control group of ships fumigated before and after but not during period of 3-hour exposure	19	32	9.4					20	9.6	0.2	

It would appear from this table that the first one or two fumigations with increased time of exposure killed more rats than previous fumigations on the same ships and that following fumigations, whether with increased exposures or not, produced less rats, presumably because there had been left fewer rats on these vessels to rebuild rat colonies. The small group of ships that escaped increased exposure fumigations, constituting a control group, subsequently showed practically the same numbers of rats as previously. It will be noted that on the ships fumigated in both increased exposure periods there occurred a much larger total average decrease in rats than on either of the groups fumigated in only one such period.

USE OF THE AIR JET GUN

FUMIGATING BILGES VIA SOUNDING PIPES

The latest development in the use of the air jet gun (October, 1931) is to pass compressed air through liquid HCN contained in an applicator and to carry it, still under compression, to the gun, where it is delivered through the nozzle as required. To accomplish this the air supply line is connected to the gas valve of the applicator, while the line to the gun is attached to the air valve. The air passing through the liquid picks up sufficient HCN to fumigate small inclosed spaces. Two desirable results are obtained: The line carrying liquid HCN under pressure to the gun, always recognized as a hazard to the operator, is eliminated and the use of a much larger volume of compressed air, greatly promoting deep penetration, is permitted. This development is of special value in fumigating bilges by way of the sounding pipes, since the HCN can be blown down these pipes as a vapor instead of as a liquid spray. By inserting the nozzle through a hole in a large cork pushed into the deck opening of the sounding pipe, it can at once be ascertained whether the pipe is blocked; if it is the cork is promptly blown out.

RAT SIGNS ON CARGO

An interesting observation of rat signs on the cargo made during investigations of loaded ships became of exceptional value in estimating rat infestation in the holds. Obviously, rat droppings on the surface of the cargo must have been left there since the cargo was loaded; on the surface of bulk cargo rat tracks have the same significance. Since the length of time that the cargo has been in place may be readily ascertained, the amount of evidence thereon more accurately indicates the numbers of rats in a hold than is usually indicated by similar signs on empty ships. Conversely, absence of rat signs on the cargo is exceptionally strong evidence of the absence of rats. The total absence of rat tracks on the surface of such bulk cargoes as

grain, linseed, and dry ores is practically proof that no rats are present. It is interesting to note that in rat-infested loaded holds some droppings, and often a disproportionately large number, are nearly always directly under the hatches.

FUMIGATION OF TEA

With the cooperation of a large tea importing company a number of samples of tea were fumigated for two hours with liquid HCN containing 10 per cent of chloropicrin, in concentrations from 2 to 8 ounces per 1,000 cubic feet. When these samples were tested by three tea experts on the following day they could not be distinguished from unfumigated samples.

FUMIGATION OF FRESH FRUIT AND VEGETABLES

It has been definitely determined that HCN in high concentrations interferes with the ripening processes of fresh fruits and causes delicate vegetables, such as lettuce, to wilt. This effect appears some days after the fumigation. In the concentration used to destroy rats on ships, however, no injurious effect has been noted. In one experiment conducted in cooperation with a large steamship company, a number of samples of various fruits and vegetables were fumigated with HCN and with sulphur (by burning) in the amounts used for ship fumigation. After fumigation and over-night airing the samples were stored with similar unfumigated produce. Ten days later the HCN fumigated samples showed no deterioration, but those fumigated with sulphur were spotted or had turned dark, becoming a partial or total commercial loss.

MICROSCOPIC EXAMINATION FOR INTESTINAL PARASITES OF 73 BOYS IN THE NATIONAL TRAINING SCHOOL FOR BOYS, WASHINGTON, D. C.

By C. E. Baker, M. A., *Laboratory Aide, National Institute of Health*

On various occasions fecal specimens from the boys in the National Training School for Boys, Washington, D. C., have been examined for parasites at the National Institute of Health.

During the period October 23, 1929, to January 9, 1930, an examination of this kind was made of 73 of these boys, of whom 67 came from the southern part of the United States. The distribution by States was as follows:

	Number of boys		Number of boys
Alabama	7	Florida	1
Arkansas	2	Georgia	5
California	1	Illinois	1
District of Columbia	2	Kentucky	7

	Number of boys		Number of boys
Louisiana	3	Tennessee	2
Mississippi	3	Texas	6
North Carolina	17	West Virginia	11
Oklahoma	1		
Porto Rico	1	Total	73
South Carolina	3		

The boys from California and the District of Columbia were negative for parasites.

Of the 73 boys examined, 56 harbored intestinal parasites, a total percentage of 76.7 positive.

In Table 1 the incidence of infection is shown; in Table 2 the presumptive geographic origin of the parasites is tabulated; and Table 3 shows the number of cases with pure infections and the number with mixed infections.

As the sanitation of the training school is strictly urban, it is scarcely to be assumed that many of the boys received their infections in the District of Columbia. On the contrary, it is to be assumed that the hookworm cases in particular brought their infections with them, as hookworm disease is not common, if found at all, in the District of Columbia, except in imported cases.

On the basis of a single specimen from each boy, 34.2 per cent were found to be infected with hookworms. Though the number (73) of specimens was small, the percentage of positives is at least confirmatory of the view that hookworm disease is still prevalent in the South.

In regard to some of the other infections found, it can not be so definitely said that the infections were brought here by the boys. Certain infections (whipworms) seem to increase with the length of institutional life in this locality, and conceivably this fact might account for some of the infections.

In view of the sanitary conditions of the school, it was thought possible that some of the infections may have been spread by infected persons handling food and that cysts or larvae of the parasites might be found under the finger nails. With this thought in mind the scrapings from under the nails of 47 boys were examined. Unfortunately for our particular purpose, most of the boys had cleaned their nails just before reporting to us. In spite of this fact an *Endamoeba* cyst was found under the nail in one case. This boy had previously been examined for parasites and had been found to be infected with *Endamoeba coli* and *Endamoeba histolytica*. At the time the cyst was found under the nail, the boy was detailed to the kitchen of the officers' mess.

The two most interesting facts brought out by these examinations of clinically unselected boys were as follows:

(1) The percentage (34.2 per cent) found infected with hookworms agrees fairly well with the average percentage (28.1 per cent) found

by seven southern State boards of health in 1929 [1] and with the uncorrected percentage (32.5 per cent) observed by Stiles and Collins on the basis of symptoms observed in school inspection of 18,649 pupils in seven States in 1931.

(2) For the first time, as far as we know, an *Endamoeba* cyst has been found under the nail of a boy infected with *Endamoeba histolytica*. Thus the demonstration is given of what many persons have assumed with good reason to occur.

TABLE 1.—*Incidence of zooparasitic intestinal infections among the 73 boys*

	Number of boys infected	Per cent of boys infected
PROTOZOA		
Rhizopoda:		
Endamoeba coli	25	34.2
Endamoeba histolytica	6	8.2
Endolimax nana	16	21.9
Endolimax williamsi	1	1.4
Unidentifiable cysts	2	2.7
Flagellata:		
Chilomastix mesnili	3	4.1
Giardia lamblia	11	15.1
WORMS		
Cestoda:		
Hymenolepis nana	7	9.6
Nematoda:		
Necator americanus	25	34.2
Ascaris lumbricoides	3	4.1
Trichuris trichiura	10	13.7
Strongyloides stercoralis	2	2.7
Free living	1	1.4
Total	56	76.7

TABLE 2.—*Presumptive geographic origin of parasitic infections*

	Alabama	Arkansas	Florida	Georgia	Illinois	Kentucky	Louisiana	Mississippi	North Carolina	Oklahoma	Porto Rico	South Carolina	Tennessee	Texas	West Virginia	Total
Endamoeba coli	2	1		2	1	2	1	1	5		1	2	2	2	3	25
Endamoeba histolytica	1					1			2			1	1			6
Endolimax nana	1		1	2	1	1		1	4	1		1	1	1	1	16
Endolimax williamsi				1												1
Unidentifiable cysts									1						1	2
Chilomastix mesnili							1		1				1			3
Giardia lamblia	1			2	1	1	1		1			1	1	1	1	11
Hymenolepis nana	1				1	1		1					1	1	1	7
Necator americanus	3		1	2		4		1	10		1			1	2	25
Ascaris lumbricoides						1			1						1	3
Trichuris trichiura						3	1		2		1				3	10
Strongyloides stercoralis									1						1	2
Ovum of free living nematode														1		1

[1] Stiles, C. W. (1930): Pub. Health Rep., vol. 45, No. 31, Aug. 1, 1930, p. 1765.

TABLE 3.—*Pure and mixed infections*

Pure infections:
- *Endamoeba coli* in 7 cases.
- *Endolimax nana* in 5 cases.
- *Giardia lamblia* in 2 cases.
- Unidentifiable amoeba cyst in 1 case.
- *Necator americanus* in 7 cases.
- *Ascaris lumbricoides* in 1 case.
- *Trichuris trichiura* in 1 case.

Double infections:
- *Endamoeba coli* and *Endamoeba histolytica* in 1 case.
- *Endamoeba coli* and *Chilomastix mesnili* in 2 cases.
- *Endamoeba coli* and *Giardia lamblia* in 1 case.
- *Endamoeba coli* and *Necator americanus* in 2 cases.
- *Endolimax nana* and *Hymenolepis nana* in 2 cases.
- *Endolimax nana* and *Necator americanus* in 2 cases.
- *Endolimax nana* and *Trichuris trichiura* in 1 case.
- Unidentifiable amoeba cyst and *Necator americanus* in 1 case.
- *Giardia lamblia* and *Necator americanus* in 2 cases.
- *Giardia lamblia* and *Trichuris trichiura* in 1 case.
- *Hymenolepis nana* and *Necator americanus* in 1 case.
- *Hymenolepis nana* and ovum of free living nematode in 1 case.
- *Necator americanus* and *Trichuris trichiura* in 1 case.

Triple infections:
- *Endamoeba coli*, *Endamoeba histolytica*, and *Hymenolepis nana* in 1 case.
- *Endamoeba coli*, *Endamoeba histolytica*, and *Necator americanus* in 1 case.
- *Endamoeba coli*, *Endolimax nana*, and *Giardia lamblia* in 1 case.
- *Endamoeba coli*, *Endolimax nana*, and *Necator americanus* in 1 case.
- *Endamoeba coli*, *Necator americanus*, and *Trichuris trichiura* in 1 case.
- *Endamoeba coli*, *Trichuris trichiura*, and *Strongyloides stercoralis* in 1 case.
- *Necator americanus*, *Ascaris lumbricoides*, and *Trichuris trichiura* in 1 case.

Quadruple infections:
- *Endamoeba coli*, *Endamoeba histolytica*, *Giardia lamblia*, and *Necator americanus* in 1 case.
- *Endamoeba coli*, *Endamoeba histolytica*, *Necator americanus*, and *Trichuris trichiura* in 1 case.
- *Endamoeba coli*, *Endolimax nana*, *Chilomastix mesnili*, and *Giardia lamblia* in 1 case.
- *Endamoeba coli*, *Endolimax nana*, *Giardia lamblia*, and *Hymenolepis nana* in 1 case.
- *Hymenolepis nana*, *Necator americanus*, *Ascaris lumbricoides*, and *Trichuris trichiura* in 1 case.

Quintuple infections:
- *Endamoeba coli*, *Endolimax nana*, *Endolimax williamsi*, *Giardia lamblia*, and *Necator americanus* in 1 case.

Sextuple infections:
- *Endamoeba coli*, *Endamoeba histolytica*, *Endolimax nana*, *Necator americanus*, *Trichuris trichiura*, and *Strongyloides stercoralis* in 1 case.

COURT DECISIONS RELATING TO PUBLIC HEALTH

Quarantine for venereal disease upheld.—(Missouri Supreme Court; Ex parte Lewis, 42 S. W. (2d) 21; decided Sept. 28, 1931.) An ordinance of the city of St. Louis provided, in part, as follows:

SEC. 9. When any person is arrested for being a prostitute, a keeper, inmate, or frequenter of a house of ill-fame, prostitution, or assignation, or for lewd, lascivious conduct, said person shall be subjected to a physical examination by a physician of the division of health for the purpose of determining if such person is infected with a venereal disease in the infectious stage.

If such examination should reveal that such person is suffering from and afflicted with a venereal disease in an infectious stage, such person shall be quarantined and detained in a hospital provided by the city of St. Louis until such time as such person is no longer capable of conveying the disease to others: *Provided, however*, That any person so quarantined and detained may, at his or her option, be cared for at his or her own expense by his or her own physician.

The petitioner was arrested on a charge of being an inmate of a house of prostitution. Pursuant to the above ordinance, she was subjected to a physical examination and, upon being found to be suffering from syphilis and gonorrhea, was quarantined and detained in a hospital provided by the city for that purpose. She sought her release by habeas corpus, claiming that the ordinance was unconstitutional and void. The case was submitted on an agreed statement of facts, by the terms of which the parties agreed that the petitioner was lawfully detained if the ordinance in question was valid.

The first objection made against the validity of the ordinance was that it violated the due process clause of the State and Federal constitutions. Respecting this the supreme court pointed out that it was well settled that laws and ordinances prescribing regulations for the promotion of the health and welfare of the people were referable to the police power and, if reasonable, were not obnoxious to the due process clause. Applying this principle to the instant case, the court ruled against the objection made, saying:

It appears from the provisions of the ordinance in question that it was enacted to protect and promote the health of the people, and is, therefore, fairly referable to the police power of the city, and for that reason is not violative of the constitutional provisions invoked.

The next contention was that the ordinance conferred judicial power upon an administrative officer in violation of the State constitution. In holding that the ordinance was not subject to this objection, the court stated, in part, as follows:

* * * A power is not necessarily judicial, within the meaning of the constitutional provision invoked, merely because its exercise requires an investigation of the facts and the exercise of judgment within lines prescribed by the law which confers the power. * * *

The ordinance under consideration does not authorize the health officers to determine what the law is or what diseases will subject the prisoner to quaran-

tine and detention in a hospital. True, the ordinance authorizes the health officers to determine whether or not the prisoner is afflicted with a venereal disease in an infectious stage, but such authority only authorizes the health officer to determine the facts upon which the ordinance, by its own terms, operates. For reasons heretofore stated, the determination of such fact is not the exercise of either legislative, executive, or judicial power within the meaning of the constitution.

The final contention made against the ordinance was that it violated that part of the State constitution which provided that no person should be prosecuted criminally for a felony or misdemeanor otherwise than by indictment or information. The court held that there was no merit in this contention and stated the following reasons therefor:

* * * (1) Petitioner was not prosecuted on any charge. The isolation of the petitioner was neither a prosecution or punishment for the commission of a felony or misdemeanor. Ex parte Brooks, 85 Tex. Cr. R. 397, 212 S. W. 956, 957. And (2) if she had been prosecuted under a city ordinance, it would not have been a criminal prosecution, and for that reason the constitutional provision invoked would have had no application. [Cases cited.]

It was the court's conclusion that the petitioner was "quarantined and detained pursuant to the provisions of a valid ordinance."

Wife granted a divorce where husband had communicated syphilis to her.—(New Jersey Court of Errors and Appeals; Gartner *v.* Gartner, 156 A. 673; decided Oct. 19, 1931.) A wife brought suit for divorce on the ground of extreme cruelty, it being alleged that her husband had communicated syphilis to her. The appellate court summed up the evidence in the following words:

The testimony reasonably shows that appellant was free of disease when she married respondent; that, as a consequence of sexual intercourse with her husband, she contracted syphilis; that respondent knew he was infected with the disease prior to his marriage; and that he had reason to know he was suffering from the disease during the period of cohabitation with his wife.

The court then proceeded to say that it thought the true rule had been stated in the case of Danielly *v.* Danielly, 93 N. J. Eq. 556, 118 A. 335, 336, as follows:

It has been held that where a husband afflicted with a venereal disease, having reason to know it, has communicated it to his wife, he is guilty of extreme cruelty. Cook *v.* Cook, 32 N. J. Eq. 475. See also Crane *v.* Crane, 62 N. J. Eq. 21, 26, 49 A. 734; Rogers *v.* Rogers, 81 N. J. Eq. 479, 484, 86 A. 935, 46 L. R. A. (N. S.) 711. It is gross cruelty for a husband to communicate to his wife a venereal disease; and, if he does it, his knowledge of his condition and the danger of infection will be presumed. 1 Bish. M. D. & S. sec. 1581.

The court granted a decree of divorce to the wife.

DEATHS DURING WEEK ENDED NOVEMBER 21, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended November 21, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Nov. 21, 1931	Corresponding week, 1930
Policies in force	74, 167, 145	75, 226, 750
Number of death claims	13, 440	14, 232
Death claims per 1,000 policies in force, annual rate	9. 4	9. 9
Death claims per 1,000 policies, first 47 weeks of year, annual rate	9. 6	9. 6

Deaths [1] from all causes in certain large cities of the United States during the week ended November 21, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Nov. 21, 1931				Corresponding week, 1930		Death rate [2] for the first 47 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7, 623	11.1	634	[4] 50	11.8	707	11.8	11.0
Akron	39	7.7	6	59	7.3	4	7.6	7.9
Albany [5]	34	13.7	1	20	15.5	5	13.9	14.8
Atlanta [6]	101	19.0	4	39	15.9	5	15.0	15.4
White	52	14.7	2	30	13.0	2	11.6	11.6
Colored	49	27.4	2	58	21.8	3	21.8	23.2
Baltimore [5] [6]	196	12.6	22	77	12.0	14	14.3	14.0
White	145	11.3	18	80	12.0	10	13.0	12.7
Colored	51	18.1	4	64	17.4	4	20.2	19.9
Birmingham [6]	65	12.6	6	60	11.4	7	13.2	13.6
White	32	10.0	2	34	6.8	1	10.1	10.0
Colored	33	16.8	4	98	18.8	6	18.1	19.4
Boston	217	14.4	25	72	13.9	23	14.2	14.1
Bridgeport	24	8.5	2	34	12.4	4	11.0	10.9
Buffalo	133	11.9	12	54	13.7	16	12.9	12.9
Cambridge	29	13.3	8	165	12.8	1	12.1	11.8
Camden	30	13.1	2	35	13.2	5	14.1	13.5
Canton	25	12.2	4	99	10.9	2	10.1	9.9
Chicago [5]	589	8.9	51	46	10.8	54	10.5	10.4
Cincinnati	128	14.6	9	54	15.9	9	15.9	15.6
Cleveland	187	10.7	12	35	13.2	20	11.1	11.1
Columbus	80	14.1	7	68	12.2	4	13.5	15.4
Dallas [6]	46	8.8	5		11.7	5	11.1	11.5
White	33	7.6	5		10.8	3	9.8	10.5
Colored	13	14.3	0		16.2	2	17.5	16.2
Dayton	53	11.9	8	114	7.8	6	10.6	9.6
Denver	88	15.7	11	111	18.1	12	13.8	14.9
Des Moines	32	11.5	2	38	12.0	2	11.0	11.7
Detroit	229	7.2	21	33	9.0	34	8.2	9.3
Duluth	25	12.8	2	54	12.8	2	11.3	11.5
El Paso	28	13.9	3		19.3	4	15.2	17.1
Erie	23	10.2	1	21	13.9	1	10.2	11.2
Fall River [5] [7]	26	11.8	1	24	8.1	3	11.1	11.6
Flint	26	8.3	2	25	7.3	1	6.9	9.1
Fort Worth [6]	21	6.5	4		11.4	6	10.6	10.8
White	17	6.3	3		10.2	6	10.2	10.3
Colored	4	7.7	1		17.8	0	12.4	13.6
Grand Rapids	46	14.0	1	15	6.2	6	9.1	10.1
Houston [6]	67	11.3	10		12.5	6	11.0	12.1
White	50	11.5	8		10.6	3	10.2	10.7
Colored	17	10.7	2		17.9	3	13.4	16.0
Indianapolis [6]	96	13.5	10	77	13.6	7	13.7	14.5
White	83	13.3	10	88	13.5	7	13.2	13.5
Colored	13	15.0	0	0	14.1	0	17.1	21.5

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended November 21, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Nov. 21, 1931				Corresponding week, 1930		Death rate [2] for the first 47 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Jersey City	60	9.8	10	89	11.8	14	11.3	11.3
Kansas City, Kans [6]	32	13.6	3	66	11.1	1	12.6	11.7
White	23	12.1	3	80	11.0	1	11.9	11.0
Colored	9	20.0	0	0	11.4	0	15.7	15.0
Kansas City, Mo	100	12.8	4	32	14.2	11	13.0	13.3
Knoxville [6]	27	12.9	2	43	11.8	3	12.4	13.6
White	21	12.0	2	49	10.5	3	11.6	12.7
Colored	6	17.6	0	0	18.1	0	16.4	18.0
Long Beach	23	7.9	0	0	14.5	0	9.9	10.0
Los Angeles	295	11.7	27	79	10.1	7	10.6	11.0
Louisville [6]	67	11.3	3	27	13.9	9	13.8	13.6
White	54	10.8	3	31	11.8	9	12.4	12.1
Colored	13	14.2	0	0	25.2	0	21.5	21.7
Lowell [7]	22	11.4	1	26	12.0	4	12.7	13.4
Lynn	16	8.1	0	0	12.7	4	9.3	10.4
Memphis [6]	76	15.3	7	74	12.3	6	16.5	16.9
White	34	11.1	4	67	11.0	3	13.5	13.2
Colored	42	22.1	3	87	14.5	3	21.5	22.9
Miami [6]	27	12.5	4	103	9.9	0	11.7	10.9
White	20	12.0	3	108	9.1	0	10.8	9.6
Colored	7	14.4	1	91	12.4	0	14.9	15.3
Milwaukee	94	8.3	14	63	9.6	8	9.1	9.6
Minneapolis	80	8.8	2	13	10.4	10	11.0	10.7
Nashville [6]	50	16.8	6	90	20.0	13	16.8	16.6
White	36	16.7	3	50	17.8	13	14.4	14.0
Colored	14	17.1	3	189	25.5	0	23.0	23.2
New Bedford [7]	24	11.1	2	52	10.7	0	12.0	10.9
New Haven	45	14.4	5	76	11.9	6	12.5	12.7
New Orleans [6]	118	13.2	7	39	18.1	13	16.7	17.4
White	74	11.6	4	34	15.2	6	13.6	14.3
Colored	44	17.0	3	50	25.3	7	24.3	24.9
New York	1,407	10.3	109	46	9.7	107	11.0	10.8
Bronx borough	199	7.8	15	43	7.9	19	8.1	7.9
Brooklyn borough	512	10.2	51	54	8.3	33	10.2	9.8
Manhattan borough	517	14.8	38	51	15.2	43	16.7	16.0
Queens borough	143	6.5	4	16	5.8	11	7.2	7.0
Richmond borough	36	11.5	1	19	10.1	1	13.6	13.9
Newark, N. J	98	11.5	9	48	11.2	8	11.5	12.0
Oakland	61	10.9	2	25	13.7	13	10.5	11.0
Oklahoma City	44	11.7	4	56	10.6	2	10.7	10.6
Omaha	63	15.2	6	69	15.3	4	13.8	13.6
Paterson	32	12.0	3	51	12.8	1	13.3	12.1
Peoria	18	8.7	1	26	9.4	1	12.5	12.2
Philadelphia	463	12.3	40	58	12.5	46	12.9	12.6
Pittsburgh	162	12.5	12	42	13.3	26	14.4	13.8
Portland, Oreg	74	12.6	5	61	11.4	2	11.6	12.1
Providence	58	11.9	7	64	10.9	1	12.6	12.8
Richmond [6]	47	13.3	2	29	15.1	5	15.4	14.9
White	33	13.1	1	22	12.4	3	13.0	12.2
Colored	14	13.8	1	43	21.6	2	21.3	21.5
Rochester	68	10.7	2	18	11.3	4	11.8	11.6
St. Louis	203	12.8	14	50	14.4	13	14.9	14.1
St. Paul	39	7.4	1	10	10.1	4	10.4	10.1
Salt Lake City [5]	27	9.8	0	0	15.6	4	12.1	12.5
San Antonio	47	10.2	6	-------	13.4	10	14.1	15.9
San Diego	50	16.7	4	83	16.4	3	13.5	14.3
San Francisco	155	12.4	6	40	18.2	8	12.9	13.0
Schenectady	25	13.6	1	30	9.8	3	10.7	11.2
Seattle	74	10.4	6	59	10.5	1	11.3	10.8
Somerville	16	7.9	2	62	6.0	2	8.8	9.7
South Bend	13	6.3	1	26	10.4	1	8.0	8.9
Spokane	23	10.3	0	0	11.7	1	12.3	12.5
Springfield, Mass	21	7.2	1	17	8.7	4	11.5	12.1
Syracuse	39	9.5	3	37	11.4	5	11.5	11.6
Tacoma	22	10.6	1	28	8.8	1	12.1	12.5
Toledo	50	8.8	4	38	8.9	6	11.8	12.7
Trenton	42	17.7	4	73	16.5	6	16.3	16.5

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended November 21, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)—Continued

City	Week ended Nov. 21, 1931				Corresponding week, 1930		Death rate [2] for the first 47 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Utica	32	16.3	2	56	15.4	1	14.3	14.9
Washington, D. C.[6]	170	18.1	16	89	15.9	23	15.9	15.2
White	106	15.5	6	49	14.7	9	13.6	13.0
Colored	64	24.7	10	171	19.2	14	22.0	20.8
Waterbury	14	7.2	1	25	8.9	2	9.7	9.4
Wilmington, Del.[7]	24	11.7	1	23	11.3	2	13.8	14.3
Worcester	49	13.0	4	57	15.2	7	12.0	12.7
Yonkers	21	7.9	2	48	9.6	1	8.3	8.1
Youngstown	33	10.0	3	41	14.1	2	9.9	10.4

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color, the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 23; Nashville, 28 New Orleans, 29; Richmond, 29; and Washington, D. C., 27.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended November 28, 1931, and November 29, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 28, 1931, and November 29, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930
New England States:								
Maine	2	5	1	1	213	15	0	0
New Hampshire	9	3			10		0	0
Vermont	1	3			64		0	0
Massachusetts	47	68	1	3	114	162	1	1
Rhode Island	12	4		3	155	3	0	0
Connecticut	2	9	1	3	44	85	0	1
Middle Atlantic States:								
New York	119	93	[1] 15	[1] 15	278	112	8	11
New Jersey	27	65	12	8	29	120	2	4
Pennsylvania	98	108			305	359	5	12
East North Central States:								
Ohio	111	84	22	18	74	29	1	8
Indiana	90	46	9	6	19	84	0	5
Illinois	140	179	10	7	29	113	8	6
Michigan	53	77		0	52	68	1	6
Wisconsin	22	18	20	25	16	205	0	1
West North Central States:								
Minnesota	27	13		2	8	8	2	2
Iowa	21	9			2	5	2	0
Missouri	72	52	16	2	22	331	1	4
North Dakota	5	6				3	1	0
South Dakota	4	6			38	2	0	1
Nebraska	29	19	5	5	14	3	0	0
Kansas	71	15		1	12	10	0	0
South Atlantic States:								
Delaware	33	5				3	1	0
Maryland [2]	82	40	8	9	6	8	1	0
District of Columbia	19	3			5	1	0	0
Virginia								
West Virginia	69	19	9	32	286	27	1	1
North Carolina	116	93	89	4	15	25	2	2
South Carolina [3]	27	34	401	588	3		0	1
Georgia [3]	35	11	36	53	10	3	2	1
Florida	10	9	1	2	1	2	0	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 1 case in South Carolina, 4 cases in Georgia, and 3 cases in Alabama.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 28, 1931, and November 29, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930
East South Central States:								
Kentucky	81	15					1	0
Tennessee	78	23	29	75	17	17	6	1
Alabama [3]	84	70	21	64	6	28	0	0
Mississippi	87	35					0	1
West South Central States:								
Arkansas	23	33	10	31	1		0	1
Louisiana	49	34	10	8	5	8	0	2
Oklahoma [4]	90	59	16	29		36	0	3
Texas	92	60	5	44	11	1	0	1
Mountain States:								
Montana	5	2	2		329	5	0	0
Idaho						1	0	4
Wyoming		1			2		0	0
Colorado	4	17			1	101	1	1
New Mexico	14	10			9	24	1	1
Arizona	12	4	2	2		100	2	1
Utah [2]	1	6	11	5		2	2	1
Pacific States:								
Washington	5	3			31	6	2	0
Oregon		6	24	13	1	29	0	1
California	91	66	42	43	116	188	5	4

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930
New England States:								
Maine	0	2	33	12	0	0	5	9
New Hampshire	0	0	6	8	0	0	0	1
Vermont	1	0	4	1	9	1	0	0
Massachusetts	12	14	221	175	0	0	1	10
Rhode Island	0	0	21	14	0	0	0	0
Connecticut	3	0	44	36	0	0	2	3
Middle Atlantic States:								
New York	16	4	419	380	36	3	15	22
New Jersey	9	1	106	149	0	0	5	5
Pennsylvania	10	1	423	300	0	0	43	30
East North Central States:								
Ohio	1	17	460	470	22	53	14	20
Indiana	0	2	107	145	10	62	3	1
Illinois	8	11	235	245	17	26	20	4
Michigan	5	6	178	25	24	50	5	6
Wisconsin	0	3	56	90	1	7	7	7
West North Central States:								
Minnesota	4	2	44	36	2	2	1	0
Iowa	11	0	40	69	137	10	2	6
Missouri	1	3	66	68	1	6	9	14
North Dakota	2	0	10	16	6	13	0	4
South Dakota	0	1	11	13	9	16	2	3
Nebraska	0	5	30	18	22	33	1	1
Kansas	0	4	57	52	11	12	1	6

[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 1 case in South Carolina, 4 cases in Georgia, and 3 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended November 28, 1931, and November 29, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930	Week ended Nov. 28, 1931	Week ended Nov. 29, 1930
South Atlantic States:								
Delaware	0	0	9	9	0	0	0	4
Maryland [2]	2	0	95	68	0	0	17	12
District of Columbia	0	0	18	28	0	0	2	2
Virginia					5			
West Virginia	1	0	73	87	0	59	38	22
North Carolina	2	1	123	103	1	5	14	8
South Carolina [3]	1	0	14	32	0	1	16	19
Georgia [3]	0	0	29	16	1	0	19	5
Florida	1	0	6	6	0	0	1	2
East South Central States:								
Kentucky	1	2	88	41	7	0	31	10
Tennessee	1	1	72	44	2	1	23	18
Alabama [3]	1	3	71	79	0	1	22	8
Mississippi	0	0	39	31	2	0	0	11
West South Central States:								
Arkansas	1	2	23	14	4	1	6	29
Louisiana	1	3	22	26	8	2	11	20
Oklahoma [4]	0	1	45	62	1	5	29	82
Texas	0	4	39	27	9	4	9	25
Mountain States:								
Montana	1	1	18	33	1	6	0	1
Idaho	0	0	7	2	0	1	0	1
Wyoming	0	0	14	3	0	0	0	0
Colorado	0	2	17	40	0	6	8	5
New Mexico	0	0	15	1	0	0	9	3
Arizona	1	1	4	1	0	0	0	1
Utah [2]	1	0	6	11	0	3	0	0
Pacific States:								
Washington	2	0	48	37	20	11	1	3
Oregon	0	0	19	26	6	10	2	4
California	2	27	122	96	14	18	10	8

[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 1 case in South Carolina, 4 cases in Georgia, and 3 cases in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October, 1931										
Colorado	1	30		1	11		1	76	0	62
Montana	1	2	10		118		7	45	1	21
Nevada		2		2			0	4	1	3
North Carolina	5	865	18		148	89	14	581	5	114
Oklahoma [1]	2	577	64	171	10	33	3	193	15	221
Oregon	2	16	121	3	37		2	64	19	15
Pennsylvania	30	409		1	527	3	139	882	0	336
South Dakota	3	34	5		119		3	41	11	11
Virginia	4	1,360	774	57	78	23	13	557	4	215
Washington	2	41	22		69		19	165	22	21

[1] Exclusive of Oklahoma City and Tulsa.

October, 1931	Cases
Chicken pox:	
Colorado	107
Montana	54
Nevada	3
North Carolina	109
Oklahoma [1]	1
Oregon	178
Pennsylvania	691
South Dakota	102
Virginia	87
Washington	331
Conjunctivitis:	
Oklahoma [1]	1
Diarrhea and dysentery:	
Nevada (children)	5
Virginia	460
Dysentery:	
Montana	3
Oklahoma [1]	27
Oregon	1
Pennsylvania	5
Washington	2
German measles:	
Colorado	2
Montana	2
North Carolina	12
Washington	16
Hookworm disease:	
Oklahoma [1]	1
Impetigo contagiosa:	
Colorado	35
Oklahoma [1]	4
Oregon	40
Washington	4
Lead poisoning:	
Pennsylvania	1
Lethargic encephalitis:	
Oregon	2
Pennsylvania	2
Washington	1
Mumps:	
Colorado	28
Montana	4
Oklahoma [1]	7
Oregon	63
Pennsylvania	516
South Dakota	37
Washington	58
Ophthalmia neonatorum:	
North Carolina	2
Oklahoma [1]	2
Pennsylvania	13
Paratyphoid fever:	
Colorado	1
North Carolina	2

[1] Exclusive of Oklahoma City and Tulsa.

Paratyphoid fever—Continued.	Cases
Oregon	1
Washington	1
Puerperal septicemia:	
Pennsylvania	24
Washington	3
Rocky Mountain spotted or tick fever:	
Colorado	1
Scabies:	
Oklahoma [1]	2
Oregon	55
Septic sore throat:	
Colorado	1
Montana	1
North Carolina	28
Oklahoma [1]	45
Oregon	4
Tetanus:	
Oklahoma [1]	1
Pennsylvania	8
Trachoma:	
Montana	1
Oklahoma [1]	12
Oregon	6
Pennsylvania	1
South Dakota	3
Washington	2
Trench mouth:	
Oklahoma [1]	7
Trichinosis:	
Pennsylvania	6
Tularaemia:	
Oregon	1
Virginia	2
Undulant fever:	
Oklahoma [1]	2
Oregon	3
Pennsylvania	4
South Dakota	3
Virginia	2
Washington	5
Vincent's angina:	
Colorado	1
Oklahoma [1]	6
Oregon	13
Washington	3
Whooping cough:	
Colorado	34
Montana	44
Nevada	4
North Carolina	345
Oklahoma [1]	45
Oregon	24
Pennsylvania	1,537
South Dakota	24
Virginia	542
Washington	104

Cases of Certain Communicable Diseases Reported for the Month of August, 1931, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	13	8	15	33	34	1	62	11	73
New Hampshire		4			8	0		8	
Vermont	21	8	18	29	48	19	19	0	69
Massachusetts	112	132	179	185	290	0	417	35	557
Rhode Island	3	8	96	11	26	0	46	16	21
Connecticut	31	20	72	70	39	0	90	22	289
New York	194	233	793	261	393	6	1,552	203	1,754
New Jersey	35	64	98	63	117	0	409	40	1,260
Pennsylvania	138	186	413	380	327	0	601	177	1,479
Ohio	58	101	162	139	351	18	263	188	772
Indiana	11	52	54	16	80	61	239	67	171
Illinois	66	179	218	127	242	37	1,019	115	1,067
Michigan	101	66	92	127	260	21	625	45	1,005
Wisconsin	112	44	151	216	61	4	161	13	600
Minnesota	47	33	19		74	8	142	27	60
Iowa	14	15	8	14	36	32	48	17	62
Missouri	9	77	16	35	65	11	250	106	498
North Dakota	12	17	31	22	14	20	15	43	121
South Dakota	29	19	6	15	17	3	18	8	23
Nebraska	11	11	13	83	27	10	28	21	74
Kansas	19	30	17	80	52	6	146	40	120
Delaware	3		5	11		0	23		24
Maryland	16	45	37	22	41	0	[1] 260	118	462
District of Columbia	10	24	8		16	0	91	6	81
Virginia	84	123	101		125	3	152	254	518
West Virginia	24	37	160		58	3	41	170	211
North Carolina	5	132	76		132	2		222	388
South Carolina		72	52	25	21	0	130	410	170
Georgia	11	61	55	25	76		165	320	48
Florida	3	12	5	6	6	1	[1] 54	13	5
Kentucky [2]									
Tennessee	12	57	36	23	94	20	236	518	254
Alabama	19	112	64	15	85	4	464	255	62
Mississippi	166	162	25	67	58	30	101	217	283
Arkansas	2	58	5	17	8	18	[1] 20	208	36
Louisiana	5	69	6	12	46	6	[1] 143	248	18
Oklahoma [3]	9	97	4	2	40	15	64	199	35
Texas		80			77			128	
Montana	11	7	37	11	44	4	34	11	45
Idaho	4	9	6	5	18	1	10	8	5
Wyoming	1	1	8	1	3	0		1	21
Colorado	29	25	10	30	31	8	80	29	79
New Mexico	3	7	1	3	14	1	53	17	28
Arizona	0	4	3	1	3	1	107	18	12
Utah [2]									
Nevada	1					0	[1] 1	0	10
Washington	47	18	32	22	45	47	157	30	104
Oregon	38	19	29	27	20	35	56	22	43
California	129	148	197	140	145	28	846	90	704

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 100,000 Population (Annual Basis) for the Month of August, 1931

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	19	12	22	49	50	1	91	16	107
New Hampshire	-	10	-	-	20	0	-	20	-
Vermont	69	26	59	95	157	62	62	0	225
Massachusetts	31	36	49	51	79	0	114	10	153
Rhode Island	5	14	162	19	44	0	78	27	35
Connecticut	22	14	52	50	28	0	65	16	208
New York	18	21	73	24	36	1	142	19	161
New Jersey	10	18	28	18	33	0	116	11	358
Pennsylvania	17	22	50	46	40	0	73	21	179
Ohio	10	18	28	24	61	3	46	33	135
Indiana	4	19	19	6	29	22	86	24	61
Illinois	10	27	33	19	37	6	154	17	162
Michigan	24	16	22	30	61	5	148	11	237
Wisconsin	44	17	60	85	24	2	64	5	237
Minnesota	21	15	9	-	34	4	65	12	41
Iowa	7	7	4	7	17	15	23	8	29
Missouri	3	25	5	11	21	4	80	34	160
North Dakota	21	29	53	38	24	34	26	74	208
South Dakota	49	32	10	25	29	5	30	13	39
Nebraska	9	9	11	70	23	8	24	18	63
Kansas	12	19	11	50	32	4	91	25	75
Delaware	15	-	25	54	-	0	113	-	113
Maryland	11	32	26	16	29	0	[1] 185	84	320
District of Columbia	24	57	19	-	38	0	217	14	193
Virginia	41	59	49	-	60	1	73	123	250
West Virginia	16	25	107	-	39	2	27	120	141
North Carolina	2	48	28	-	48	1	-	81	141
South Carolina	-	49	35	17	14	0	88	277	115
Georgia	4	25	22	10	31	-	67	129	19
Florida	2	9	4	5	5	1	[1] 42	10	4
Kentucky [2]	-	-	-	-	-	-	-	-	-
Tennessee	5	25	16	10	42	9	105	230	113
Alabama	8	49	28	7	37	2	204	112	27
Mississippi	96	94	14	39	34	17	58	125	164
Arkansas	1	37	3	11	5	11	[1] 18	131	23
Louisiana	3	38	3	7	25	3	[1] 79	137	10
Oklahoma [3]	5	55	2	1	22	8	36	112	20
Texas	-	16	-	-	15	-	-	25	-
Montana	24	15	81	24	96	9	74	24	99
Idaho	11	24	16	13	47	3	26	21	13
Wyoming	5	5	41	5	15	0	-	5	108
Colorado	33	28	11	44	35	9	100	33	80
New Mexico	8	19	3	8	38	3	145	46	76
Arizona	-	11	8	3	8	3	281	47	32
Utah [2]	-	-	-	-	-	-	-	-	-
Nevada	13	-	-	-	-	0	[1] 13	0	127
Washington	35	13	24	16	33	35	110	22	122
Oregon	46	23	35	33	24	42	68	27	52
California	26	29	39	29	29	6	167	18	139

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,010,000. The estimated population of the 90 cities reporting deaths is more than 31,465,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended November 21, 1931, and November 22, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	2,472	1,939	
97 cities	606	612	965
Measles:			
45 States	1,923	2,331	
97 cities	548	795	
Meningococcus meningitis.			
46 States	66	84	
97 cities	29	47	
Poliomyelitis:			
46 States	180	184	
Scarlet fever:			
46 States	3,881	3,943	
97 cities	1,199	1,229	949
Smallpox:			
46 States	264	449	
97 cities	8	21	21
Typhoid fever:			
46 States	530	565	
97 cities	69	95	54
Deaths reported			
Influenza and pneumonia:			
90 cities	657	749	
Smallpox:			
90 cities	0	0	

City reports for week ended November 21, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	0	0	0	1	0	5	0	3
New Hampshire:								
Concord	0	0	0		0	0	0	1
Nashua	3	0	0		0	0	0	0
Vermont:								
Barre	0	0	0		0	0	0	0
Massachusetts:								
Boston	38	32	25	2	1	4	3	10
Fall River	5	4	0		0	2	2	0
Springfield	12	5	0		0	0	5	0
Worcester	2	5	2		0	1	67	1
Rhode Island:								
Pawtucket	0	1	0		0	0	0	0
Providence	10	9	2		0	84	5	3
Connecticut:								
Bridgeport	1	5	0	2	1	0	0	4
Hartford	2	5	0		0	0	1	3
New Haven	18	1	0		1	1	6	1
MIDDLE ATLANTIC								
New York:								
Buffalo	32	12	11		0	4	1	19
New York	78	149	80	9	7	16	33	136
Rochester	6	4	0		0	11	5	0
Syracuse	11	2	0		1	1	2	1
New Jersey:								
Camden	5	7	5	1	0	0	0	6
Newark	18	15	5	6	0	1	5	10
Trenton	2	2	0		0	0	0	2
Pennsylvania:								
Philadelphia	78	60	9	11	2	3	10	45
Pittsburgh	95	25	9	1	4	169	61	39
Reading	15	2	0		0	0	0	1
Scranton	9		0		0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	6	11	6		0	0	0	14
Cleveland	118	35	6	3	0	15	46	19
Columbus	8	6	14		0	1	0	3
Toledo	72	9	3	2	2	2	0	4
Indiana:								
Fort Wayne	1	4	13		0	0	0	0
Indianapolis	71	11	14		0	0	28	8
South Bend	2	2	0		0	0	0	1
Terre Haute	4	2	3		0	0	0	2
Illinois:								
Chicago	103	117	53	5	2	25	8	40
Peoria	15		4		0	0	0	1
Springfield	2	2	4		0	0	1	0
Michigan:								
Detroit	37	59	32		4	5	2	14
Flint	35	4	0		0	0	23	2
Grand Rapids	6	1	0		0	0	1	5

City reports for week ended November 21, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Wisconsin:								
Kenosha	7	1	0	----------	0	1	0	1
Madison	12	1	3	----------	----------	1	4	----------
Milwaukee	60	14	4	1	1	1	31	7
Racine	25	2	1	----------	0	0	14	0
Superior	1	0	0	----------	0	0	6	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	7	0	0	----------	0	0	1	2
Minneapolis	54	24	10	----------	0	3	19	6
St. Paul	16	9	3	----------	0	2	3	3
Iowa:								
Davenport	6	2	0	----------	----------	0	0	----------
Des Moines	0	2	5	----------	----------	1	0	----------
Sioux City	5	2	4	----------	----------	0	2	----------
Waterloo	15	0	1	----------	----------	0	0	----------
Missouri:								
Kansas City	27	9	2	----------	0	0	2	9
St. Joseph	2	1	10	----------	0	0	0	2
St. Louis	23	43	28	----------	1	2	5	8
North Dakota:								
Fargo	9	0	0	----------	0	0	0	0
Grand Forks	0	0	0	----------	----------	0	0	----------
South Dakota:								
Aberdeen	8	0	0	----------	----------	18	0	----------
Nebraska:								
Omaha	13	10	17	----------	0	1	4	7
Kansas:								
Topeka	3	1	0	----------	1	1	0	0
Wichita	12	3	16	----------	0	1	0	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	2	3	----------	0	2	0	1
Maryland:								
Baltimore	51	24	15	3	1	1	29	23
Cumberland	8	0	1	----------	0	0	0	2
Frederick	0	0	0	----------	0	0	0	0
District of Columbia:								
Washington	7	17	15	2	2	3	0	14
Virginia:								
Lynchburg	0	4	0	----------	0	1	1	1
Norfolk	2	3	4	----------	0	2	0	5
Richmond	1	18	15	----------	1	0	0	5
Roanoke	4	4	10	----------	0	0	0	1
West Virginia:								
Charleston	23	3	3	----------	0	1	0	2
Wheeling	15	1	0	----------	0	0	0	2
North Carolina:								
Raleigh	2	3	4	----------	0	0	0	1
Wilmington	0	2	0	----------	0	0	0	1
Winston-Salem	8	5	6	----------	0	0	2	0
South Carolina:								
Charleston	1	2	2	28	0	0	0	3
Columbia	0	1	0	----------	1	0	0	3
Greenville	10	1	0	----------	0	0	0	0
Georgia:								
Atlanta	3	8	4	14	1	0	1	13
Brunswick	0	0	0	----------	0	0	0	0
Savannah	1	3	0	5	0	0	0	5
Florida:								
Miami	0	2	2	----------	0	2	0	2
Tampa	2	2	3	1	0	0	0	0

City reports for week ended November 21, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	2	3	3		0	0	0	3
Tennessee:								
Memphis	6	10	13		1	0	2	7
Nashville	0	4	4		2	1	0	9
Alabama:								
Birmingham	0	8	6		0	0	0	7
Mobile	0	2	1		1	0	0	3
Montgomery	0	3	2			4	2	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	0	3			0	0	
Little Rock	0	2	2		0	0	0	2
Louisiana:								
New Orleans		14						
Shreveport	3	2	4		0	3	0	2
Oklahoma:								
Muskogee	1	3	8		0	0	0	0
Tulsa	0	6	40			0	0	
Texas:								
Dallas	2	20	23	1	1	0	0	4
Galveston	0	1	0		0	0	0	0
Houston	0	9	16		0	0	0	9
San Antonio	0	5	1	1	1	0	0	2
MOUNTAIN								
Montana:								
Billings	0	0	0		0	68	0	0
Great Falls	1	0	0		0	0	0	1
Helena	2	0	0		0	16	0	0
Missoula	0	1	0		0	0	0	0
Idaho:								
Boise	1	0	0		0	0	0	0
Colorado:								
Denver	60	11	1		2	2	3	14
Pueblo	8	1	0		0	0	0	1
New Mexico:								
Albuquerque	1	0	3		0	0	0	1
Arizona:								
Phoenix	0	1	1		0	0	0	1
Utah:								
Salt Lake City	53	4	1		0	1	1	4
Nevada:								
Reno	0	0	0		0	0	0	0
PACIFIC								
Washington:								
Seattle	36	5	3			20	8	
Spokane	9	2	0			0	0	
Tacoma	1	4	1		0	0	4	2
Oregon:								
Portland	29	10	0	3	0	2	8	4
Salem	4	0	0	4	0	0	2	
California:								
Los Angeles	27	35	42	33	1	3	0	13
Sacramento	2	3	3	1	0	32	0	2
San Francisco	62	13	1	8	1	15	1	4

City reports for week ended November 21, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	1	2	0	0	0	0	1	0	0	2	27
New Hampshire:											
Concord	0	0	0	0	0	0	0	0	0	0	10
Nashua	1	1	0	0	0	0	0	0	0	3	--------
Vermont:											
Barre	0	1	0	0	0	1	0	0	0	0	5
Massachusetts:											
Boston	54	54	0	0	0	13	2	3	0	19	217
Fall River	3	5	0	0	0	1	0	1	0	0	26
Springfield	5	7	0	0	0	0	1	0	0	13	18
Worcester	11	24	0	0	0	0	0	0	0	17	49
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	13
Providence	10	9	0	0	0	1	0	0	1	1	58
Connecticut:											
Bridgeport	6	2	0	0	0	0	1	0	0	2	24
Hartford	5	3	0	0	0	1	0	0	0	1	--------
New Haven	3	1	0	0	0	1	0	0	0	2	45
MIDDLE ATLANTIC											
New York:											
Buffalo	21	32	0	0	0	8	1	0	0	137	138
New York	93	93	0	0	0	77	14	11	0	137	1,406
Rochester	6	51	0	0	0	3	0	0	0	6	94
Syracuse	6	12	0	0	0	1	0	1	0	40	30
New Jersey:											
Camden	3	8	0	0	0	1	1	0	0	2	30
Newark	11	12	0	0	0	7	1	0	0	49	101
Trenton	2	8	0	0	0	2	0	[1] 1	0	4	42
Pennsylvania:											
Philadelphia	60	80	0	0	0	21	4	2	1	141	463
Pittsburgh	36	60	0	0	0	12	0	4	0	23	162
Reading	1	3	0	0	0	1	0	0	0	6	18
Scranton	2	9	--------	0	0	0	0	0	0	4	--------
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	16	53	0	0	0	4	0	0	0	3	128
Cleveland	29	62	0	0	0	6	1	0	0	160	187
Columbus	9	30	0	0	0	1	0	1	0	5	80
Toledo	11	9	0	0	0	3	1	0	1	27	50
Indiana:											
Fort Wayne	3	1	1	0	0	0	0	1	0	0	26
Indianapolis	13	4	2	0	0	3	0	1	0	9	--------
South Bend	4	0	0	0	0	1	0	0	0	0	13
Terre Haute	3	0	0	0	0	0	0	0	0	0	15
Illinois:											
Chicago	98	115	0	0	0	43	3	3	0	148	589
Peoria	--------	3	--------	0	0	0	--------	0	0	19	18
Springfield	2	6	0	0	0	0	0	0	0	8	--------
Michigan:											
Detroit	74	80	1	0	0	18	2	2	0	56	229
Flint	12	6	0	0	0	2	0	0	0	15	26
Grand Rapids	9	13	0	0	0	0	0	0	0	10	46
Wisconsin:											
Kenosha	1	5	0	0	0	0	0	0	0	1	4
Madison	2	0	0	0	--------	--------	0	0	--------	1	--------
Milwaukee	16	21	0	0	0	2	0	0	0	108	94
Racine	4	1	0	0	0	1	0	0	0	7	12
Superior	2	0	0	0	0	0	0	0	0	0	5

[1] Nonresident.

City reports for week ended November 21, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	0	0	0	0	0	0	1	1	2	25
Minneapolis	37	10	0	0	0	0	0	0	0	9	80
St. Paul	16	3	0	0	0	2	0	0	0	5	43
Iowa:											
Davenport	0	5	0	0	--------	--------	0	0	--------	0	--------
Des Moines	8	5	2	0	--------	--------	0	0	--------	0	32
Sioux City	3	5	0	3	--------	--------	0	0	--------	3	--------
Waterloo	2	0	0	1	--------	--------	0	0	--------	10	--------
Missouri:											
Kansas City	14	9	0	0	0	6	1	0	0	15	100
St. Joseph	3	1	0	0	0	0	0	0	1	0	16
St. Louis	35	24	0	1	0	10	3	2	0	65	203
North Dakota:											
Fargo	2	8	0	0	0	0	0	0	0	4	7
Grand Forks	1	0	0	0	--------	--------	0	0	--------	0	--------
South Dakota:											
Aberdeen	0	2	0	0	--------	--------	0	0	--------	5	--------
Nebraska:											
Omaha	5	4	2	0	0	2	0	1	0	4	63
Kansas:											
Topeka	3	1	0	0	0	1	0	0	0	3	17
Wichita	5	4	1	0	0	0	0	0	0	1	23
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	5	0	0	0	0	1	0	0	4	24
Maryland:											
Baltimore	17	25	0	0	0	11	3	4	0	121	196
Cumberland	1	6	0	0	0	0	0	1	0	7	11
Frederick	1	0	0	0	0	0	0	0	0	0	4
District of Col.:											
Washington	16	27	1	0	0	16	2	5	1	13	170
Virginia:											
Lynchburg	1	2	0	0	0	0	0	0	0	0	18
Norfolk	3	13	0	0	0	1	0	0	1	0	--------
Richmond	8	29	0	0	0	3	0	0	0	0	52
Roanoke	4	1	0	0	0	1	0	0	0	0	11
West Virginia:											
Charleston	2	2	0	0	0	4	0	[1] 2	1	8	22
Wheeling	2	3	0	0	0	1	0	0	0	2	21
North Carolina:											
Raleigh	1	3	0	0	0	0	0	0	0	1	7
Wilmington	1	1	0	0	0	0	0	0	0	0	11
Winston-Salem	4	4	1	0	0	1	0	0	0	5	10
South Carolina:											
Charleston	1	2	0	0	0	2	0	0	0	0	24
Columbia	1	2	0	0	0	1	0	0	0	3	18
Greenville	1	2	--------	0	0	0	--------	0	0	1	--------
Georgia:											
Atlanta	7	12	0	0	0	6	1	0	0	0	101
Brunswick	0	0	0	0	0	0	0	0	0	0	2
Savannah	0	4	0	0	0	3	0	0	1	0	30
Florida:											
Miami	1	1	0	0	0	3	0	0	0	0	27
Tampa	0	3	0	0	0	0	0	0	0	3	25
EAST SOUTH CENTRAL											
Kentucky:											
Covington	1	2	0	0	0	0	0	0	0	0	19
Tennessee:											
Memphis	7	5	0	0	0	7	2	3	1	37	76
Nashville	4	3	0	0	0	1	1	1	0	8	50
Alabama:											
Birmingham	4	9	0	0	0	1	1	3	0	0	--------
Mobile	1	4	0	0	0	0	0	0	0	0	27
Montgomery	1	2	0	0	--------	--------	0	0	--------	0	--------

[1] Nonresidents.

City reports for week ended November 21, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	1	0	0			0	0		3	
Little Rock	2	3	0	0	0	2	1	0	0	0	6
Louisiana:											
New Orleans	9		0				2				
Shreveport	2	1	0	0	0	2	1	0	0	3	28
Oklahoma:											
Muskogee		1		0	0	0		0	0	4	
Tulsa	3	4	0	0			0	0		0	
Texas:											
Dallas	8	8	0	0	0	1	1	5	0	0	46
Galveston	1	0	0	0	0	1	1	0	0	0	12
Houston	3	0	0	0	0	5	0	0	0	0	67
San Antonio	1	0	1	0	0	9	0	0	1	0	47
MOUNTAIN											
Montana:											
Billings	0	0	0	0	0	0	0	0	0	0	8
Great Falls	2	4	0	0	0	0	0	0	0	0	8
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	1	0	0	0	0	0	0	0	0	0	6
Idaho:											
Boise	0	0	0	0	0	1	0	0	0	0	4
Colorado:											
Denver	12	15	0	0	0	9	1	0	0	10	88
Pueblo	1	1	0	0	0	0	0	1	0	2	14
New Mexico:											
Albuquerque	0	3	0	0	0	4	1	1	0	1	8
Arizona:											
Phoenix	2	1		0	0	0	0	0	0	1	
Utah:											
Salt Lake City	3	5	1	0	0	2	1	0	0	1	27
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	3
PACIFIC											
Washington:											
Seattle	10	9	1	0			1	3		4	
Spokane	6	5	7	1			1	0		0	
Tacoma	3	0	1	0	0	0	0	0	0	0	22
Oregon:											
Portland	8	4	2	1	0	1	1	0	1	0	74
Salem	0	0	0	0	0	0		0	0	2	
California:											
Los Angeles	24	47	1	0	0	15	1	3	0	15	295
Sacramento	3	1	1	0	0	2	0	0	0	4	28
San Francisco	13	4	0	2	0	11	1	3	0	8	138

City reports for week ended November 21, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	0	1
Massachusetts:									
Boston	1	0	0	0	0	0	2	2	0
Springfield	0	0	0	0	0	0	0	3	0
Worcester	0	0	0	0	0	0	0	1	0
MIDDLE ATLANTIC									
New York:									
New York City	6	6	1	2	0	0	5	11	1
Syracuse	1	0	0	0	0	0	0	0	0
New Jersey:									
Camden	0	0	0	0	0	0	0	1	1
Pennsylvania:									
Philadelphia	3	2	0	0	0	0	1	2	1
Pittsburgh	1	1	0	0	0	0	0	0	0
Scranton	0	0	0	0	0	0	------	1	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	1	0
Cleveland	0	0	0	1	0	0	1	2	0
Columbus	0	0	1	1	0	1	0	0	0
Toledo	0	0	1	1	0	0	1	0	0
Illinois:									
Chicago	6	4	0	0	0	0	1	4	2
Peoria	0	0	0	0	0	0	0	1	0
Michigan:									
Detroit	1	0	1	0	0	0	0	1	0
Flint	0	0	0	1	0	0	0	0	0
Wisconsin:									
Madison	1	0	0	0	0	0	0	0	0
Milwaukee	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	0	0	0	0	0	0	0	2	1
St. Paul	0	0	0	0	0	0	0	5	2
SOUTH ATLANTIC									
Maryland:									
Baltimore	1	0	0	0	0	0	0	0	0
North Carolina:									
Raleigh [1]	0	0	0	0	1	0	0	0	0
Wilmington	0	0	0	0	0	1	0	0	0
South Carolina:									
Charleston	0	0	0	0	0	0	0	0	0
Georgia: [1]									
Savannah [1]	0	0	0	0	2	1	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	5	1	0	0	0	0	0	1	0
Alabama:									
Birmingham	1	2	1	0	2	1	0	0	0
Mobile	0	0	0	0	0	1	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	2	0	0	0
Texas:									
Dallas	0	1	0	0	0	0	0	0	0
Houston	1	0	0	0	0	0	0	0	0

[1] Typhus fever, 5 cases; 1 case at Raleigh, N. C.; 1 case at Atlanta, Ga.; and 3 cases at Savannah, Ga.

City reports for week ended November 21, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MOUNTAIN									
Utah:									
Salt Lake City	1	0	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	0	0	0	0	0	0	1	2	0
San Francisco	0	1	0	0	0	0	0	0	0

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended November 21, 1931, compared with those for a like period ended November 22, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, October 18 to November 21, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930
98 cities	82	77	85	90	[2] 94	[3] 82	[4] 96	89	[5] 96	100
New England	87	106	63	92	84	85	50	82	70	123
Middle Atlantic	32	34	41	44	32	33	52	44	53	52
East North Central	74	105	82	130	97	109	[6] 76	128	91	124
West North Central	145	66	174	93	155	[3] 77	184	107	174	110
South Atlantic	223	106	146	116	182	86	146	120	172	154
East South Central	122	179	204	293	[7] 280	215	227	185	169	275
West South Central	142	80	162	101	203	190	233	160	[5] 238	171
Mountain	35	62	9	35	[8] 49	123	[9] 63	26	17	26
Pacific	76	101	92	67	[10] 104	93	127	63	98	63

MEASLES CASE RATES

	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930
98 cities	32	36	37	50	[2] 39	[3] 59	[4] 40	91	[5] 87	126
New England	180	75	115	138	161	128	238	172	233	179
Middle Atlantic	19	29	30	27	27	34	38	68	92	76
East North Central	18	16	18	18	18	16	[6] 19	17	29	31
West North Central	6	143	11	294	15	[3] 282	17	502	19	767
South Atlantic	10	14	12	20	12	48	10	26	31	64
East South Central	17	24	23	42	[7] 13	84	12	18	29	149
West South Central	24	3	17	0	27	0	24	0	[5] 15	3
Mountain	17	141	61	414	[8] 157	220	[9] 63	308	757	326
Pacific	60	18	125	24	[10] 109	24	135	32	149	28

SCARLET FEVER CASE RATES

	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930
98 cities	126	121	130	161	[2] 170	[3] 169	[4] 169	187	[5] 189	195
New England	195	157	142	213	202	225	221	276	200	237
Middle Atlantic	100	78	127	132	134	133	131	126	163	159
East North Central	140	171	161	218	239	231	[6] 212	287	241	263
West North Central	119	116	136	163	140	[3] 140	149	143	132	219
South Atlantic	156	102	158	166	190	158	230	154	250	216
East South Central	145	149	198	245	[7] 107	293	108	275	145	200
West South Central	57	70	47	66	95	91	122	118	[5] 63	94
Mountain	174	167	165	344	[8] 275	282	[9] 322	388	218	282
Pacific	141	89	133	47	[10] 127	95	96	99	120	87

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] Covington, Ky., Billings, Mont., Pueblo, Colo., and Spokane, Wash., not included.
[3] Waterloo, Iowa, not included.
[4] South Bend, Ind., Springfield, Ill., and Billings, Mont., not included.
[5] New Orleans, La., not included.
[6] South Bend, Ind., and Springfield, Ill., not included.
[7] Covington, Ky., not included.
[8] Billings, Mont., and Pueblo, Colo., not included.
[9] Billings, Mont., not included.
[10] Spokane, Wash., not included.

Summary of weekly reports from cities, October 18 to November 21, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 —Continued

SMALLPOX CASE RATES

	Week ended—									
	Oct. 24, 1931	Oct. 25, 1930	Oct. 31, 1931	Nov 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930
98 cities	2	2	2	3	[2] 2	[3] 2	[4] 1	4	[5] 1	3
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	0	2	1	1	0	4	[6] 0	2	0	0
West North Central	10	0	6	19	11	[3] 6	4	21	10	23
South Atlantic	4	0	0	0	0	0	0	0	0	0
East South Central	0	0	0	0	[7] 13	0	6	0	0	0
West South Central	3	7	0	3	3	7	3	3	[5] 0	3
Mountain	0	0	0	9	[8] 0	9	[9] 9	0	0	44
Pacific	12	18	12	14	[10] 4	6	4	18	6	6

TYPHOID FEVER CASE RATES

98 cities	22	17	16	14	[2] 12	[3] 11	[4] 12	15	[5] 11	15
New England	29	29	5	5	10	5	7	24	10	17
Middle Atlantic	24	12	11	9	11	5	6	4	8	5
East North Central	12	5	16	7	6	9	[6] 11	5	5	9
West North Central	19	8	19	14	21	[3] 4	13	19	8	23
South Atlantic	26	40	38	32	30	32	36	34	24	28
East South Central	105	84	6	102	[7] 19	24	23	48	41	12
West South Central	37	24	17	14	30	28	24	87	[5] 24	84
Mountain	17	79	0	0	[8] 10	18	[9] 0	26	9	53
Pacific	6	16	25	18	[10] 0	16	10	10	18	10

INFLUENZA DEATH RATES

91 cities	4	5	5	9	[11] 7	9	[4] 8	9	[5] 7	10
New England	2	2	10	2	12	2	14	5	7	7
Middle Atlantic	2	6	4	9	8	12	10	8	6	7
East North Central	3	3	6	6	5	6	[6] 2	9	4	5
West North Central	3	9	0	9	6	3	6	6	6	6
South Atlantic	10	4	4	18	4	10	6	6	12	24
East South Central	13	6	6	13	[7] 0	26	0	39	25	18
West South Central	17	7	0	21	17	14	7	28	[5] 10	36
Mountain	9	9	17	18	[8] 20	9	[9] 27	9	17	62
Pacific	7	7	2	2	5	7	12	5	5	7

PNEUMONIA DEATH RATES

91 cities	60	86	82	99	[11] 87	101	[4] 86	115	[5] 102	116
New England	50	99	90	104	67	89	101	114	84	126
Middle Atlantic	78	102	96	109	107	116	106	120	116	133
East North Central	52	52	63	87	64	74	[6] 50	85	70	82
West North Central	91	60	75	96	80	87	88	78	115	138
South Atlantic	67	136	113	134	117	152	97	172	152	156
East South Central	95	84	101	65	[7] 123	136	151	188	183	175
West South Central	97	125	86	103	66	110	55	103	[5] 95	114
Mountain	78	79	52	167	[8] 128	194	[9] 152	220	174	167
Pacific	55	60	46	32	53	42	70	67	50	50

[2] Covington, Ky.; Billings, Mont.; Pueblo, Colo.; and Spokane, Wash., not included.
[3] Waterloo, Iowa, not included.
[4] South Bend, Ind.; Springfield, Ill.; and Billings, Mont., not included.
[5] New Orleans, La., not included.
[6] South Bend, Ind., and Springfield, Ill., not included.
[7] Covington, Ky., not included.
[8] Billings, Mont., and Pueblo, Colo., not included.
[9] Billings, Mont., not included.
[10] Spokane, Wash., not included.
[11] Covington, Ky., Billings, Mont., and Pueblo, Colo., not included.

85722°—31——3

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended November 14, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended November 14, 1931, as follows:

Province	Cerebrospinal meningitis	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia		1				
New Brunswick [1]						
Quebec	1	9		17		47
Ontario	1	1	1	7	5	26
Manitoba	1					9
Saskatchewan	1				18	4
Alberta					1	
British Columbia					1	2
Total	4	11	1	24	25	88

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended November 14, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended November 14, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	1	Paratyphoid fever	1
Chicken pox	134	Poliomyelitis	17
Diphtheria	81	Puerperal septicemia	1
German measles	66	Scarlet fever	100
Influenza	9	Tuberculosis	44
Measles	71	Typhoid fever	46
Mumps	3	Whooping cough	31

Saskatchewan—Vital statistics—1930.—According to information published by the Provincial Department of Statistics of Saskatchewan, Canada, birth and death rates in the Province for the year 1930 were as follows:

	Rate
Birth rate per 1,000 population	25.0
Infant mortality per 1,000 live births	72.6
Death rate per 1,000 population	7.2

CZECHOSLOVAKIA

Communicable diseases—September, 1931.—During the month of September, 1931, certain communicable diseases were reported in the Republic of Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	6	1	Paratyphoid fever	30	2
Cerebrospinal meningitis	3	2	Puerperal fever	40	15
Diphtheria	2,126	105	Scarlet fever	1,634	32
Dysentery	89	19	Trachoma	123	
Malaria	36		Typhoid fever	782	65

IRAQ

Cholera.—The number of cases of and deaths from cholera reported in Iraq since the beginning of the outbreak in the latter part of July, 1931, up to October 30, 1931, are as follows:

Locality	Cases	Deaths	Locality	Cases	Deaths
Abulkhasib	6	5	Diwaniyah	2	
Amara	70	62	Diwaniyah Province	110	76
Amara Province	328	213	Muntafiq Province	494	362
Basra	1,106	603	Nasiriyah	95	87
Basra Province	104	52	Qurnah	9	7

MEXICO

Monterrey—Malaria.—According to recent information, malaria was said to have been epidemic at Monterrey, Mexico, during the present year. Although measures were taken in recent years by the sanitary authorities to eradicate mosquito-breeding places, and for a time there was a marked reduction in the number of persons affected by the disease this year, owing to the continuous rains mosquitoes soon became numerous again. A large number of persons employed by industrial establishments, as well as many school teachers and pupils, have been affected by malaria.

The use of quinine in combatting the disease has been largely confined to the upper and middle classes. Promise of assistance in the distribution of quinine to malaria patients has been made by the government of the State of Nuevo Leon, of which Monterrey is the capital, as well as by the more important industrial establishments located there.

YUGOSLAVIA

Communicable diseases—October, 1931.—During the month of October, 1931, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	95	13	Poliomyelitis	5	
Cerebrospinal meningitis	7	3	Rabies	1	1
Diphtheria	1,186	137	Scarlet fever	891	52
Dysentery	100	23	Sepsis	12	2
Erysipelas	251	18	Tetanus	35	11
Measles	1,528	7	Typhoid fever	672	86
Paratyphoid fever	9		Typhus fever	1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931			
						5	12	19	26	3	10	17	24	31	7	14	21	28
Ceylon: Colombo	C	1		3														1
	D	1		3														1
China:																		
Canton	C	1			1	1												
Shanghai	C		1	7	1	58	30	36	35	29	17	17	8					
	D					3	4	2	5	8			4					
Swatow	C	10	7															
Tientsin	C	10																
	D	1																
India	C	18,001	22,074	36,514	10,734	9,834	9,740	8,915	7,552	10,172								
	D	10,337	12,093	20,276	6,044	5,518	5,321	4,800	3,716	4,808								
Bombay	C		23	44	27	5	5	5	1	1	2		4	1				
	D		16	25	9	5	2	1		1	2			1				
Calcutta	C	292	237	110	10	3	15	18	18	23	3	7	14					
	D	168	155	30	4	2	3	6	6	12		5	9					
Chittagong	C											1						
Karikal	C			1	1			1	1									
	D			1	1			1										
Madras	C	9	4	6	3	1	1											
	D	4																
Moulmein	C		1															
	D		1															
Negapatam	C				1													
Rangoon	C	4	4	1					1				1					
	D	2	1	1					1				1					
Vizagapatam	C	1																
India (French):																		
Chandernagor	C	3	5	7		1	1		1									
	D	3	1	7		1	1		1									
Pondicherry	C	3	3	3	2			2		1								
	D	3	3	2	1			1										

India (Portuguese)	C	1	2	2	1	2	25	6		17	19							
	D		1	2	1	1	10	6		10	4							
Indo-China (see also table below):																		
Cochin-China—Rachgia	C			P														
Pnompenh	C	1	5	2			1	1		1				2	2			
	D	1	2	1			1	1		1								
Saigon and Cholon	C	61	14								1							
	D	41	7								1							
Iraq:																		
Abulkhasib	C				6													
	D				5													
Amara	C			2	22	35	8	1			2	2	2			3	3	
	D			1	21	30	7	1				1	1			2	4	
Amara Province	C				6	11	106	73	32	21	15	27	13	7	15			3
	D				5	4	67	44	29	24	14	17	10	6	8			2
Basra	C			547	148		54	91	77	19	29	32	35	30	9	1		
	D			287	76		30	48	34	11	13	26	7	15	10	1		
Basra Province	C			5	14	6	10	23	26	14	1	1	3	7				
	D			2	10	3	7	10	9	8	1	1	1	4				
Dinwaniyah	C								1									
Dinwaniyah Province	C								15	8	14	24	22	1				
	D								11	6	5	22	10	5				
Iwaniyah	C								22									
	D								15									
Muntafiq Province	C				10	21	66	128	55	54	45	55	17	19	9	23	1	1
	D				8	20	42	75	38	57	28	37	10	18	6	17	3	
Nasiriyah	C					22	50	16	4	4	18	7	4	7	6	7	2	6
	D					15	40	20	3	4	18	3	3	6	3	6		7
Suqelshuyukh	C				2													
	D				2													
Japan: Taiwan—Kelung	C														2			
Persia:[1]																		
Abadan	C											1		3				
Ahwaz	C											12		84	16	103		
	D											7		69	21	8		
Mohammerah	C											1						
Philippine Islands:[2] Provinces—																		
Capiz	C	4				9	9	17	49	21	5	4		7	5			4
	D	4				5	6	5	35	16	5	3		5	4			4
Cebu	C			3														
	D			3														
Iloilo	C	26	27															
	D	21	25															
Negros: Occidental	C	2																
	D	1																
Siam	C	4	3	1	1													
	D	2	1		1													
Bangkok	C	1	4	1	1													
	D	1	2															

[1] On Oct. 23, 1931, cholera was reported at Mohammerah, Abadan, and Ahwaz, Persia. During the period from Oct. 22 to Nov. 7, 1931, 141 cases and 97 deaths were reported. The diagnosis of cholera was not confirmed upon bacteriological examination.

[2] Figures for cholera in the Philippine Islands are subject to correction.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	12	19	26	October, 1931 3	10	17	24	31	November, 1931 7	14	21	28
On vessel:																			
S. S. City of Eastborne, at Calcutta, from Cocanada	C	1																	
S. S. Tairea, at Penang, from Calcutta	C	1																	
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C		1																
	D		1																
S. S. Kohistan, at Basra, from Bushire, Persia	C		2																
S. S. Cathay, at Kobe, Japan, from Shanghai	C			4															
	D			1															
S. S. Kasagi Maru, at Moji, from Shanghai	C					1													
S. S. Ankoo, at Nagasaki, from Shanghai	C						2												
	D						1												

Place		April, 1931	May, 1931	June, 1931	July, 1931 1-10	11-20	21-31	August, 1931 1-10	11-20	21-31	September, 1931 1-10	11-20	21-30	October, 1931 1-10	11-20	21-31
Indo-China (French) (see also table above):																
Cambodia [1]	C	113	117	308	72	82	87	12				8	6	1	16	2
	D	70	63	109			60	2				4	3	1	16	1
Cochin-China [1]	C	107	174	140	66	30	47	39				9	9	11	2	1
	D	74	133	106			42	32				6	7	10	2	1

[1] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	12	19	26	October, 1931 3	10	17	24	31	November, 1931 7	14	21
Algeria:																	
Algiers	C			2													
Bone	C	1															
Philippeville	C		1	2													
	D		1	1													
Argentina: San Juan Province	C		P														
Belgian Congo	C	1															
	D	1															
British East Africa (see also table below):																	
Tanganyika	C	17	6	8				4	8	2							
	D	10	6	2				4	4								
Uganda	C	298	418	283	59	59	107	84	83	62							
	D	286	400	281	61	56	107	83	82	63							
Ceylon: Colombo	C	2	1	6		1	1	1	1	1	2						
	D	2	1	6		1	1	1	1	1	1						
Plague-infected rats				8													
Chile: Santiago	C											1					
	D											1					
China:[1]																	
Shansi Province[2]	C													P			
Shensi Province	C													P			
Dutch East Indies:																	
Batavia and West Java	C	116	75	58	19	18	8	20	21	31					1		
	D	66	75	58	19	18	8	20	21	31							
Java and Madura	D	192	212	205	58	68	51	56	77	69	85	94	97				
Egypt:																	
Alexandria	C	4	13	9	2	2		1	1				1	1	3	1	
	D	4	5	3	1	1									1	1	1
Assiout	C	11															
	D	1															
Beheira	C					2											
Dakahlia	C		1	2													
Deirout	C	3															
	D	1															

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April. On Sept. 19, 1931, 18 deaths were reported in Changchuanpu and new cases in Kaitung and Fengtien.

[2] On Oct. 17, 1931, plague epidemic was reported in western Shansi Province, China, with 2,000 deaths at Hsinghsien.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug 22, 1931	Week ended— Aug. 29, 1931	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14	21
Egypt—Continued																	
Gharbieh	C	1															
	D	1															
Girga	C		1														
Kena	C																2
	D																1
Minieh	C	3	12												1	3	
	D	1	4												1	1	
Port Said	C	3	5	2									1			1	2
	D	2	1														2
Tanta	C			2		1		1									2
	D																2
France: Rouen—Devilleles	C													P			
Hawaii Territory:																	
Hawaii—Hamakua—Plague-infected rats				1													
Maui Island—																	
Haliimaile—Plague-infected rats								1									
Kula District	C			1													
	D			1													
Makawao—Plague-infected rats								1									
Paia—Plague-infected rats									1								
Paauilo—Plague-infected rats														1			
India	C	88	221	654	282	337	554	659	722	527							
	D	51	125	440	146	179	238	209	355	222							
Bassein	C		4	2		1	2	1	1				1				
	D		3	2		1	2	1	1				1				
Bombay	C		12								1		1				
	D		6								1						
Plague-infected rats		37	48	47	23	17	7	10	9	9	12	12	4		11		
Burma	C		16														
	D		10														
Madras Presidency	C	6	21		9	75	88	114		62	20	[illegible]					
	D	1	9		4	51	52	75		16	30	[illegible]					
Moulmein	C		0		P	5											
	D		1			4	3	2	2								

Rangoon	C	1	2	1	2	1							5				1
	D	1	1	1	1	1							1				1
Plague-infected rats		3	6	3	1	1	1	1	1	1	1	1	1				
Indo-China (see also table below): Pnompenh	C	3															
	D	2															
Iraq:																	
Baghdad	C	23	3	1		2	1							1			1
	D	9	2			1											1
Maudhan	C														2	1	1
	D														1		1
Madagascar (see also table below): Tamatave	C			1			2		1								
Morocco	C								10			8	2	2			
	D											8		4			
Peru (see table below).																	
Senegal (see table below).																	
Siam	C	1		1	1	1	1	1	1	1	1	1					1
	D	1			1	1						1					
Spain: Hospitalet—Barcelona Province	C			5	1			1	1	1			5		1	1	
	D			2				1		1			1				
Syria: Beirut	C		2	1			1	1	1	2					1		
Tunisia: Tunis	C	11					1				1						
	D	1															
Union of South Africa:																	
Cape Province—Plague-infected rats				1													
Orange Free State	C						P					P					

Place		May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931
British East Africa (see also table above):							
Kenya	C	215	154	484	235	14	19
Indo-China (see also table above)	C		2	1		1	3
	D		2	1		1	1
Madagascar (see also table above):							
Ambositra Province	C	19	15	1	2	1	
	D	18	15	1	1	1	
Antsirabe Province	C	7	12	13	22	19	
	D	7	12	12	22	19	
Miarinarivo Province	C	2		8	20	14	
	D	2		7	19	12	
Moramanga Province	C	2	1	1	3	12	
	D	2			3	11	
Tananarive Province	C	18	10	5	45	65	
	D	18	9	5	44	63	
Peru	C	2	5	3	19	2	
	D		1	2	14	2	

Place		May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931
Senegal:							
Baol [3]	C	4		27	101	13	6
	D	3		13	58	8	2
Dakar [3]	C	63	64	95	194	45	4
	D	49	56	73	106	31	4
Diourbel [3]	C					13	
	D					5	
Louga [3]	C	5	4	3	2	10	1
	D	2	2	1	1	4	2
Rufisque [3]	C	1	2	34	2	1	7
	D						1
Thies [3]	C		12	16	26	12	7
	D		3	7	16	8	5
Tivaouane [3]	C	19	3	3			
	D	11	2	2			

[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14
Algeria:																	
Algiers	C	1	8	1												1	
Constantine	C	1		1			1										
Belgian Congo	C	47	42														
Bolivia:[1]																	
Brazil: Porto Alegre (alastrim)	C	19	5	41	34	7	13	12	16	12	15						
	D			1	1	2		2			2						
British East Africa: Tanganyika	C	13	7	149	19	31	4	6	9	[illegible]	2	1,121					
	D			17				1	4	4		91					
British South Africa:																	
Northern Rhodesia	C			21	20							1					
Southern Rhodesia	C		1	2			1	2									
Canada:																	
Alberta	C			1	1					12				1	2	2	1
British Columbia	C			2	5		1	1								1	1
Manitoba	C		4						1								
Winnipeg	C							1									
Ontario	C	17	32	35	5	4		2		5	2	1	9		7	3	5
Kingston	C						1										
Ottawa	C		1					1		5	2		1		4	3	5
Sault Ste. Marie	C	1															
Toronto	C	1	1														
Quebec	C			1													
Saskatchewan	C	45	54	42	23	8	5	12	5	1	6	3	1	11	3	1	18
Regina	C	2								1			1				
Chile:																	
Antofagasta	C			1													
Chanaral	C	1															
Santiago	C													2			
	D													1			

China:																	
Amoy	C	6	4	2	1			1		1			1			1	
	D	3	3	2	1			1		1						1	
Canton	C	3	1	2		1										1	1
Foochow	C	P	P	P	P		P		P		P		P				
Hankow	C	5	4	3	3					1							
Hong Kong	C	1															
	D	2															
Manchuria—																	
Harbin (see also table below)	C	3															
Kwantung—Dairen	C	2	1														
Nanking	C	P			1												
Shanghai—																	
Foreigners only	C	7	11	3						35	20	17	17	1	6	2	12
Including natives	D	7	13	6	1	1			1	5	5					1	
Tientsin	C	2		3													
Chosen (see table below).																	
Colombia:																	
Cali	D	1															
Santa Marta	D							1									
Dutch East Indies:																	
Batavia and West Java	C	2															
East Java and Madura	C	1															
Eritrea	C	3		2		10											
	D					2											
France (see table below).																	
Great Britain:																	
England and Wales	C	570	287	187	91	33		19	45	45	41	34	41	39	42	71	68
Bradford	C	8	5														
Leeds	C	4															
London	C	183	122	54	26	3	9	5	15	5	17	15	21	20	27	55	27
London and Great Towns	C	403	228	152	69	13	30	11	34	35	31	25	37	31	57	63	45
	D		1	1													
Sheffield	C							1	1								
Greece (see table below).																	
Honduras: Puerto Castilla	C										1						1
India	C	11,403	7,313	5,359	2,927	483	484	409	329	352	525						
	D	1,849	1,704	1,352	746	144	108	109	72	100	122						
Bassein	C	1															
Bombay	C	9	6	6	2		1	2	2								
	D	4	5	6	1		1										
Calcutta	C	89	47	21	13	2	1	2		1				1			
	D	75	41	18	9	2	1	2		1				1			
Cochin	C	3			3					1	1	2	4	3		2	
Karachi	C		2		1									1			
	D		1														
Madras	C	8	2	2	1		1			1	5	6	1	2	2		
	D	6	1									2					
Negapatam	C		3	1	2	3		1			1		1				
Rangoon	C	13	6	3	4	1		1			2		1			1	
	D	5	2	1	2			1			1	1					

[1] An epidemic of smallpox was reported on May 18, with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	Sept. 12	Sept. 19	Sept. 26	October, 1931 3	Oct. 10	Oct. 17	Oct. 24	Oct. 31	November, 1931 7	Nov. 14
India—Continued																	
Tuticorin	C					2					4			1		4	
	D										1			1			
Vizagapatam	C	6	6	5	5	3	1	1	1	2	4			1			
	D	1	2	1	4	3	1	1	1		1			1			
India (French):																	
Chandernagor	C	7	1	3													
	D	5		2													
Karikal	C	4	6	4	7		2	3			3		3			3	
	D	4	6	4	6		2	1			1		3			3	
Pondicherry Province	C	11	7	28	20	1	6	1	15	1	4	14	4	9			
	D	11	7	28	20	1	6	1	16	1	4	12	4	9			
India (Portuguese)	C	3															
	D	1															
Indo-China (see also table below):																	
Pnompenh	C	1	2														
	D	1															
Saigon and Cholon	C	2		3	2	1		3	2	1	4	1			4	2	
	D	1		1	1	1		2		1	2				4	1	
Iraq:																	
Baghdad	C	3	1					1									
	D	2															
Basra	C	2	1														
Mosul Liwa	C			1	1					5							
Ivory Coast (see table below).																	
Japan: Nagoya	C			1													
Mexico (see also table below):																	
Jalisco (State)—Guadalajara	D	2	1	3	2					1	1	2				2	
Mexico City and surrounding territory	C	45	27	22	10	2	2	1		2	1	2	2	1	1	1	
	D	11	13	8	2			1	1	1	2		1	1			
Monterrey	C		1												2		
Torreon	C	1	3				1	1			1						
	D		2					1									
Vera Cruz	C	1															

Morocco (see table below).																
Netherlands: Friesland—Opsterland	C													²1		
Poland	C	3	3	18					1						1	
Portugal: Lisbon	C	67	48	45	37	10	21	18	17	16	11	6	15	19	13	
Rumania (see table below).																
Siam	C	6	5	1				3								
	D	1	1	1												
Spain	C			7												
Straits Settlements	C	2			1											
	D	2														
Sudan (Anglo-Egyptian)	C	6	1					32								
	D	2						6								
Syria (see table below).																
Turkey (see table below).																
Union of Socialist Soviet Republics (see table below).																
Union of South Africa:																
Cape Province	C	P														
Natal	C				P			P								
Orange Free State	C	P	P	P	P	P	P			P	P	P				
Transvaal	C		P	P												
Upper Volta	C	88	12	2												
	D															
On vessel:																
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C				1											
S. S. Talodi at Suakin	C	1														

Place		April, 1931	May, 1931	June, 1931	July, 1931			August, 1931			September, 1931			October, 1931		
					1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-30	1-10	11-20	21-31
Indo-China (see also table above)	C	142	58	47	1		7	29				7	27	10	11	26
	D				1		4	11				4	8	3	3	10
Ivory Coast	C									7						
	D									4						
Syria: Beirut	C			1												

Place		February, 1931	March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931
China: Harbin (see also table above)	C		7		13	10		
Chosen	C		11		1	4	2	
	D		3				1	
France	C	16	15	6	54	9	20	
Greece	C	4			3	1		
Mexico (see also table above)	D	3		1	1	2		
Morocco	C	4	6	7	49	48	23	23
Rumania	C		1		1			1

Place		February, 1931	March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931
Turkey	C	37	1		9	1		
	D	6						
Union of Socialist Soviet Republics	C		1,903	1,516	1,345			
Territories in Asia	C	532						
Ukraine	C	23						
Other territories in Europe	C	1,577						
Railroads, etc	C	77						

² Imported case.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931	
							5	12	19	26	3	10	17	24	31	7	14
Algeria:																	
Algiers	C	7	9	2									1		1	1	
Bone	C				2												
Constantine Department	C	22	26	3	1				2		1				11	16	
Oran	C	2	2		1		1										1
Australia, Western	C	1															
Bulgaria	C	16	30			1								1			
	D	4	6														
Chile: Santiago	C													3			
China:																	
Manchuria—Harbin	C		16			1											
Shanghai	C			3	1					1							
Chosen (see table below).																	
Colombia: Cali	D						1										
Czechoslovakia (see table below).																	
Egypt:																	
Alexandria	C		3					1	1								
Beheira	C															1	
Cairo	C					1											
Gharbieh	C																1
	D																1
Great Britain: Scotland—Fife County	C	1															
Greece (see table below).																	
Guatemala (see table below).																	
Iraq: Baghdad	C	2															
	D	2															
Irish Free State:																	
Cork County—																	
Schull	C			1													
Skibbereen	C		2	1													
Kerry County—																	
Dingle	C	1															
Listowel	C		1														
Limerick County—																	
Croom	C									1							
Glin	C							2		1							
Limerick	C			2	1												
Mitchelstown	C			1													
Rathkeale	C									1							

Mayo County—																
Belmullet	C	1														
Castlebar	C				1											
Westport	C				1											
Japan	C		1													
Lithuania (see table below).																
Mexico (see also table below).																
Durango	D			1												
Guadalajara	D				1											
Mexico City, including municipalities in Federal District	C	75	46	53	18	5	1	2	2	4	2	5	3	7	3	1
	D	33	19	12	10	1	1		2	2	2	2	2	2	2	
San Luis Potosi	D	2		4	1											
Torreon	C			1								1	1		3	
	D			1								1	1		5	1
Morocco	C	42	101	102	8						1		3		1	
	D	4	6	8												
Palestine	C	4	5	2	11				4	4	1	1		2		1
Panama Canal Zone—Balboa	C	2														
Poland	C	228	97	53	31	6	2	1	2	2	8	3	1	2	6	6
	D	18	4	5	2						1				1	2
Rumania	C	169	80	11	23		4	6	3	1	6	7	4			
	D	18	13	5	2				1			2	1			
Syria	C	4														
Tunisia: Tunis	C	29	73	2		1		1	1							
	D	3	4													
Turkey (see table below).																
Union of Socialist Soviet Republics (see table below).																
Union of South Africa:																
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P			
Municipality of East London	C		1		1											
Natal	C	P	P	P	P			1					P			
Orange Free State	C	P	P	12												
Transvaal	C	P	P	P	P	P	P	P	P	P	P	1	P			
Yugoslavia (see table below).																

Place		March 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Chosen: Seoul	C	3	4		6	1		
	D		1		1	1		
Czechoslovakia	C		5	11	2			
Greece	C	8	22	6	9	2	13	9
	D	1	3				2	1
Guatemala	C				33	34	3	
	D				15	5		
Lithuania	C	99	34	10	13	8	2	
	D	3	5		2			

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Mexico (see also table above)	D	238						
Turkey	C	15	32	13	11	9		16
Union of Socialist Soviet Republics	C	2,206	1,513	1,324				
Yugoslavia	C	10	43	14	2	3	1	
	D	1	5					

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931	
							5	12	19	26	3	10	17	24	31	7	14
Brazil:																	
Alagoas State	C				1												
	D				1												
Maceio	D															1	
Ceara State	C	1	1		1												
	D	1			1												
Minas Geraes State	C	2															
	D	1															
Rio de Janeiro State	C	2															
Sergipe State	C		1														
British Cameroons: Mamfe	C	3	2														
	D	2															
Colombia: Magdalena Province—Near Cienaga	C			4													
Gold Coast:																	
Akuse	C			2													
	D			1													
Dagomba District	C				4												
Kete Krachi	C											1					
Kintampo	C			1													
	D			1													
Oda	C								1								
	D								1								
Tamale	C			2						2				1			
	D			2						2							
Wale Wale	C				1												
	D				1												
Ivory Coast:																	
Bobo Dioulasso	C			1													
	D			1													
Grand Bassam	C				4			1									
	D				2			1									
Kong Circle	C			4													
Seguela	C				P												
Tehini	C															1	

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Scarlet-Fever Streptococcus Antitoxin in the Treatment of Scarlet Fever

Whole-time County Health Officers, 1931

State Mortality Statistics, Nine Months, 1931

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DIVISION OF SANITARY REPORTS AND STATISTICS

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PUBLIC HEALTH REPORTS

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SCARLET-FEVER STREPTOCOCCUS ANTITOXIN IN THE TREATMENT OF SCARLET FEVER[1]

By M. V. VELDEE, *Surgeon, United States Public Health Service;* F. E. STEVENSON, M. D., *Assistant Professor;* and A. GRAEME MITCHELL, M. D., *Professor of Pediatrics, College of Medicine, University of Cincinnati*

INTRODUCTION

PURPOSE OF THE STUDY

Our present conception of the use of a hemolytic streptococcus immune serum as a form of specific sero-therapy in the treatment of scarlet fever goes back to the work of Marmorek (1), in 1895, and Moser (2) in 1903. Due to the difficulties encountered by other workers, particularly Jochmann (3), in the duplication of this earlier work, belief in the hemolytic streptococcus as the causative factor in scarlet fever abated. The use of the Moser serum accompanied the hemolytic streptococcus into disfavor and so remained until the announcement of Dochez (4), and Dick and Dick (5), that they had succeeded in their efforts to produce by horse immunization an antiserum against the hemolytic streptococcus previously isolated from scarlet fever patients. There quickly followed a renewed interest in this form of sero-therapy. Blake, Trask, and Lynch (6), demonstrated the specificity of the Dochez serum by the production of the skin blanching phenomenon (Schultz-Charlton reaction) when this immune serum was injected intradermally into patients acutely ill with scarlet fever and also by its curative value in treating such cases. Dick and Dick (7) similarly demonstrated the specific curative value of the serum produced by them. They also showed that persons reacting to sterile scarlet fever streptococcus toxin when injected intradermally failed to develop such a reaction provided the toxin had previously been mixed *in vitro* with their concentrated serum and incubated for a brief period before making the injections.

The commercial producers of scarlet fever streptococcus antitoxin have now had several years in which to develop methods of production, and sufficient time has elapsed to permit a more mature observation

[1] The clinical observations on the cases reported in this study were made by Doctor Stevenson, Doctor Veldee prepared the statistical analysis and the manuscript, and Doctor Mitchell acted as consultant.

of its therapeutic value. Therefore, it seemed that the time was opportune for a carefully controlled clinical study. The purpose of the present paper is to present a detailed statistical analysis of such a study which has been conducted by the authors in the Cincinnati General Hospital.

METHOD OF SELECTING CASES

Every effort was made to avoid any form of case selection, the object being to obtain a series of control and serum-treated patients who would comprise individual groups as nearly identical as mechanical allocation would permit. However, before this could be done it seemed necessary to exclude certain types of patients who for reasons other than the nature of the disease itself could not be included.

TABLE 1.—*Number of scarlet fever cases admitted to the contagious wards during the period of the study herein reported and the disposition made of each case*

Number of cases included in antitoxin A group	74
Number of cases included in antitoxin B group	38
Number of cases included in control group	84
Total cases in study group	196
Number of cases excluded because of—	
1. Patient a nurse or medical student	16
2. Patient a private case	9
3. Patient a negro	37
4. Patient entered hospital after acute symptoms	34
5. An additional disease on admission	49
6. Uncertainty in the diagnosis on admission	31
7. Exposed to other contagious disease shortly before admission	7
8. History on case unobtainable	8
9. Patient dead on admission	1
10. Patient removed from hospital	1
11. Attending physician on leave or ill	22
Total cases admitted	411

The actual disposition of the 411 patients who were admitted to the hospital during the period of this study is recorded in Table 1. Internes, nurses, and medical students were omitted, as were private patients, since they did not come under our absolute control. The negro patients were excluded because they constituted too small a group for separate study. The 34 patients admitted to the hospital after the acute symptoms had subsided came for isolation or for the treatment of secondary complications. Those admitted only for isolation required no medication, and it did not seem advisable simply to make a study of the effects of antitoxin on secondary complications in this group of patients. Certain patients on admission were suffering from one or more diseases entirely independent of the scarlet fever infection, or had been intimately exposed to another contagious disease

and were still within its incubation period. Other patients presented atypical symptoms or signs on admission which necessitated their exclusion because of the delay involved in making the diagnosis.

The clinical observation of each case was made exclusively by one of us so that there might be a uniformity of interpretation throughout. Patients admitted to the hospital during this physician's absence therefore were omitted.

It will be seen from Table 1 and the foregoing explanation that no case was excluded from our study groups on clinical grounds, except such as were admitted late in the disease when all signs of the acute symptoms had disappeared. The 196 patients admitted to our series were automatically allocated to their respective groups purely on the basis of the time of arrival at the admitting ward. At the beginning only antitoxin A was used, during which time every alternate case coming to the receiving ward was placed in the serum-treated series, the other becoming the control. With the addition of antitoxin B the patients were allocated on admission so that out of each three cases admitted one received antitoxin A, the second became a control, and the third received antitoxin B.

TABLE 2.—*Distribution of cases into the three study groups, according to the apparent severity on admission and the day of the disease on which the eruption appeared*

Apparent severity on admission	Control groups					Antitoxin A					Antitoxin B				
		Day of disease on which eruption appeared					Day of disease on which eruption appeared					Day of disease on which eruption appeared			
			Per cent on—					Per cent on—					Per cent on—		
	Total cases	Mean	First day	Second day	Third day or later	Total cases	Mean	First day	Second day	Third day or later	Total cases	Mean	First day	Second day	Third day or later
Mild	17	2	35.3	23.5	41.2	8	2	50.0	25.0	25.0	1	2	------	------	------
Moderate	62	2	32.3	43.5	24.2	61	2	29.5	46.0	24.5	33	2	30.3	48.5	21.2
Severe	4	2	0.0	100.0	0.0	3	2	0.0	100.0	0.0	3	2	33.3	60.7	0.0
Total	83	2	31.3	42.2	26.5	72	2	30.6	45.8	23.6	37	2	29.7	51.4	18.9

That this method of distributing cases actually built up three groups which contained, at the time of admission, patients with very similar clinical manifestations is shown in Table 2. On admission, 75 per cent of the control cases, 85 per cent of those in series antitoxin A, and 90 per cent of those in series antitoxin B were moderately ill. The percentage of patients who on admission had a temperature of 101° F. or higher was 55 per cent for the control group, 64 per cent for antitoxin A, and 76 per cent for antitoxin B.

The control group did by chance receive a few more patients of a milder type. The interval before the appearance of the eruption in each group was very short, as is shown by the data given in Table 2 which to some extent suggests a similarity in the cases.

FORM OF TREATMENT USED

Aside from the use of antitoxins A and B the form of routine treatment given to the individuals comprising the three study groups during the acute stage of the disease was the same. This included catharsis as indicated, alkalies in small doses, hot salt and soda gargle, and a hypnotic when indicated. Therapeutic variations were permitted later in the disease for the treatment of complications, including serum sickness.

The antitoxin injections were always given intramuscularly, and, with the exception of four cases in the antitoxin A series, no case received more than one therapeutic dose. The injection of the antitoxin was made as promptly as the hospital routine would permit, usually within the half day of entrance. There was delay in some instances when desensitization became necessary.

SCARLET FEVER STREPTOCOCCUS ANTITOXIN USED

Antitoxins from two separate manufacturers were used which for our purposes are designated as antitoxin A and antitoxin B.

Antitoxin A.—This antitoxin was purchased in the open market on competitive bid. It was a concentrated serum prepared with four strains of hemolytic streptococci which originally had been isolated from cases of scarlet fever. The antitoxin was released by the National Institute of Health at 400 units per cubic centimeter on the manufacturer's protocol. The therapeutic package was labeled to contain 6,000 units of antitoxin which would make a volume of 15 c. c. per dose. However, there is an allowance made for deterioration, and so the actual volume of each therapeutic dose used was slightly in excess of 20 c. c. The titer of this lot was tested by one of us on January 8, 1931, when the mean of four satisfactory neutralization tests gave a potency of 360 units per cubic centimeter. These two separate potency determinations indicated that each therapeutic dose contained from 7,200 to 8,000 units (360,000 to 400,000 neutralizing skin-test doses) in a volume of about 20 c. c.

Antitoxin B.—This antitoxin was not for sale in the open market, but was available only for free distribution. The therapeutic doses supplied us were taken from the regular stock of therapeutic packages. The antitoxin was an unconcentrated serum prepared with a single strain of hemolytic streptococcus which had previously been isolated from a case of scarlet fever. The manufacturer's potency test of 800 units per cubic centimeter was corroborated by tests at the National

Institute of Health. Each therapeutic package was labeled 5,000 units, with a volume per dose of 8 c. c. Therefore, as administered, each dose contained approximately 6,400 units (320,000 neutralizing skin-test doses).

ANALYSIS OF THE CASE RECORDS

The distribution of cases into the three categories of mild, moderate, and severe, as determined by the apparent severity of the disease on admission, is indicated in Table 2. Whatever variations existed between the severity of the cases present in the antitoxin and control groups were such as occurred through chance alone, since the placing of a case in either group was determined by the time of its entrance into the admitting room of the hospital. Except for the moderately severe group, the numbers are too small to permit of individual study.

ERUPTION

The eruption has been interpreted to include both the diffuse erythema and the enlarged papillae. Likewise in our study groups the skin manifestations were not recorded as completely subsided until the papillae had returned to normal. Table 3 shows that the mean duration of the eruption in the control group, irrespective of the apparent severity of the disease, was 6.8 days—4.3 days in those treated with antitoxin A, and 4.4 days in those receiving antitoxin B. The average time of the appearance of the eruption was on the second day of the disease (i. e., about 24 hours after the onset) in those patients of moderate illness and treated with antitoxin A or B (Table 2). These same patients received their antitoxin on the third day of the disease (i. e., about 48 hours after the onset). Thus the patients had had their skin manifestations on an average for one day before receiving antitoxin. With a mean eruption duration of slightly more than four days it is evident that the rash continued for a mean of three days after the injection of the antitoxin.

TABLE 3.—*Duration of the skin eruption tabulated according to the treatment given and the apparent severity of the disease on admission*

Apparent severity on admission	Control group				Antitoxin A				Antitoxin B			
	Total cases	Duration in days			Total cases	Duration in days			Total cases	Duration in days		
		Mean	Per cent			Mean	Per cent			Mean	Per cent	
			4 days or less	8 days or less			4 days or less	8 days or less			4 days or less	8 days or less
Mild	16	6.0	37.5	93.7	8	3.8	75.0	100.0	1	2.0	------	------
Moderate	61	6.9	13.1	83.5	61	4.4	64.0	98.4	33	4.2	69.7	97.0
Severe	3	8.7	------	------	3	2.7	------	------	3	8.3	------	------
Total	80	6.8	17.5	85.0	72	4.3	66.7	98.6	37	4.4	65.0	91.9

It might be assumed that there is a direct correlation between the time of antitoxin administration and the duration of the rash. Analysis of the individual case records shows (Table 4) that such a correlation exists. Those receiving antitoxin on the first day of the disease had a skin eruption for only 3.6 days; but if the antitoxin was not given until the fifth day of the disease, the total period of the eruption averaged 6 days. The figures in Table 4 for the serum-treated group are in contrast to a mean of 6.8 days' duration for the 80 patients in the control group.

The influence of the antitoxin on the appearance of the erythema was even more marked than these figures indicate. In the vast majority of the cases the erythema had faded in the first 12 hours following antitoxin so as to represent only a half or even a fourth of its original intensity. Unfortunately, a daily record was not kept which would have shown the degree of fading that occurred each day. Disappearance of the enlarged papillae seemed to lag behind the fading of the erythema.

TABLE 4.—*Correlation between the day of the disease on which antitoxin was given*[1] *and the duration of the skin eruption in days for the two serum-treated groups of cases studied*

Day of disease	All treated cases		Treated with antitoxin A		Treated with antitoxin B	
	Number of cases	Mean duration	Number of cases	Mean duration	Number of cases	Mean duration
First	8	3.6	8	3.6	0	----------
Second	29	3.8	17	3.9	12	3.7
Third	38	4.3	28	4.3	10	4.1
Fourth	21	4.6	13	4.7	8	4.5
Fifth	8	6.0	3	5.3	5	6.4
Sixth [2]	3	----------	1	----------	2	----------
Mean for all cases	----------	4.3	70	4.3	37	4.4

[1] The mean day of the disease on which antitoxin was injected was the third day in each of the above groups.

[2] Number of cases treated on the sixth day are too few for a reliable mean.

DESQUAMATION

The interval between the first appearance of the eruption and the beginning of desquamation showed no significant variation in the three groups of cases. The mean number of days (Table 5) intervening in the control group was 5.4—in antitoxin A group 6.4, and in antitoxin B group 5.4 days. Similarly, the percentage of cases beginning desquamation within the first week was essentially the same.

TABLE 5.—*Interval between the appearance of the rash and the beginning of desquamation in the scarlet fever cases studied arranged according to the apparent severity of the disease on admission*

Apparent severity on admission	Control group				Antitoxin A				Antitoxin B			
	Total cases	Interval in days			Total cases	Interval in days			Total cases	Interval in days		
		Mean for all cases	Per cent			Mean for all cases	Per cent			Mean for all cases	Per cent	
			7 days or less	More than 7 days			7 days or less	More than 7 days			7 days or less	More than 7 days
Mild	16	6. 1	75 0	25. 0	8	10. 0	50. 0	50. 0	1	0	-----	-----
Moderate	60	5. 3	82. 0	18. 0	61	6. 1	82 0	18. 0	32	5 5	75. 0	25. 0
Severe	3	4. 3	100. 0	0. 0	3	5. 0	100 0	0. 0	3	6. 0	75 0	25. 0
Total	79	5. 4	81. 0	19. 0	72	6. 4	79. 2	20. 8	36	5. 4	75. 0	25. 0

The desquamation period in the control group of patients averaged 26.2 days (Table 6) as contrasted with 21.6 days for patients treated with antitoxin A and 20 days for those with antitoxin B. More specifically it will be observed from Table 6 that only 1.3 per cent of the control cases completed their desquamation within 14 days, whereas in the antitoxin A group 21.1 per cent were desquamation-free within the 2-week period and in the antitoxin B group 27.8 per cent. Also all patients in the control group went on to desquamation, whereas in antitoxin A group 2 patients and in antitoxin B group 4 patients went through convalescence without having any indication of desquamating.

TABLE 6.—*Duration of desquamation in the scarlet fever cases studied, arranged according to the apparent severity of the disease on admission*

Apparent severity on admission	Control group						Antitoxin A						Antitoxin B					
	Total cases	Duration in days					Total cases	Duration in days					Total cases	Duration in days				
		Mean duration	Per cent 14 days or less	Per cent 21 days or less	Per cent 28 days or less	Per cent 35 days or less		Mean duration	Per cent 14 days or less	Per cent 21 days or less	Per cent 28 days or less	Per cent 35 days or less		Mean duration	Per cent 14 days or less	Per cent 21 days or less	Per cent 28 days or less	Per cent 35 days or less
Mild	16	25. 3	6. 7	18. 7	75. 0	100 0	8	16. 8	50. 0	62. 5	87. 5	100. 0	1	0	-----	-----	-----	-----
Moderate	60	26. 8	0. 0	16. 7	65. 0	91. 7	60	22. 3	18. 3	31. 7	86. 7	100. 0	32	19. 3	28. 1	40. 6	78. 1	97. 0
Severe	3	29. 1	0. 0	0. 0	33. 3	100. 0	3	22. 0	0. 0	0. 0	33. 3	100. 0	3	34. 0	0. 0	0. 0	33. 3	100 0
Total	79	26. 2	1. 3	16. 5	65. 8	93. 7	71	21. 6	21. 1	33. 8	84. 5	100 0	36	20 0	27. 8	38. 9	75. 0	94. 5

Differences in the character and extent of the desquamation between the three study groups were even more striking than the duration of the peeling. In the control group desquamation was marked in 41.8 per cent (Table 7), whereas in only 9.6 per cent of antitoxin A group and 19.4 per cent of antitoxin B group was the desquamation of the same character. In the serum-treated groups the tendency was for the desquamation to be moderate or mild in character as contrasted to moderate or marked in the control group.

TABLE 7.—*The character of the desquamation in the scarlet fever cases studied, cases arranged according to the apparent severity of the disease on admission and the type of treatment given*

Apparent severity on admission	Character of desquamation	Control group		Antitoxin A		Antitoxin B	
		Number	Per cent	Number	Per cent	Number	Per cent
Mild	Desquamation absent	0	0.0	1		1	
	Desquamation mild	10	62.5	6		0	
	Desquamation moderate	4	25.0	1		0	
	Desquamation marked	2	12.5	0		0	
Total		16	100.0	8		1	
Moderate	Desquamation absent	0		1	1.6	3	9.4
	Desquamation mild	14	23.4	41	66.1	13	40.6
	Desquamation moderate	17	28.3	15	24.2	12	37.5
	Desquamation marked	29	48.3	5	8.1	4	12.5
Total		60	100.0	62	100.0	32	100.0
Severe	Desquamation absent	0		0		0	
	Desquamation mild	0		0		0	
	Desquamation moderate	1		1		0	
	Desquamation marked	2		2		3	
Total		3		3		3	
All cases	Desquamation absent	0	0.0	2	2.7	4	11.2
	Desquamation mild	24	30.4	47	64.4	13	36.1
	Desquamation moderate	22	27.8	17	23.3	12	33.3
	Desquamation marked	33	41.8	7	9.6	7	19.4
Total		79	100.0	73	100.0	36	100.0

The distribution of the desquamation showed a definite tendency to remain much more circumscribed in the serum-treated cases. Of all the control cases 91.1 per cent desquamated generally over the entire body. Similar desquamation occurred in 37 per cent of the patients treated with antitoxin A and 58.3 per cent of those with antitoxin B. (Table 8.) This leaves in the control group only 8.9 per cent whose desquamation remained localized, while in 56 per cent of the serum-treated patients desquamation was either absent or remained localized.

TABLE 8.—*The extent of the desquamation in the scarlet fever cases studied, cases arranged according to the apparent severity of disease on admission and the type of treatment given*

Apparent severity on admission	Extent of desquamation	Control group		Antitoxin A		Antitoxin B	
		Number	Per cent	Number	Per cent	Number	Per cent
Mild	Desquamation absent	0	0 0	1	12 5	1	
	Desquamation localized	3	18.7	6	75 0	0	
	Desquamation generalized.	13	81 3	1	12 5	0	
Total		16	100 0	8	100 0	1	
Moderate	Desquamation absent	0		1	1 6	3	9.3
	Desquamation localized	4	6 6	36	58.1	11	34.4
	Desquamation generalized.	56	93 4	25	40 3	18	56.2
Total		60	100.0	62	100 0	32	100.0
Severe	Desquamation absent	0		0		0	
	Desquamation localized.	0		2		0	
	Desquamation generalized.	3		1		3	
Total		3		3		3	
All cases	Desquamation absent	0	0.0	2	2.7	4	11.1
	Desquamation localized.	7	8.9	44	60 3	11	30.6
	Desquamation generalized.	72	91.1	27	37.0	21	58.3
Total		79	100.0	73	100.0	36	100.0

The variations in the character and extent of the desquamation between the control and serum-treated groups may be shown even more conclusively by combining the data from Tables 7 and 8. The distribution of cases then stands as follows, showing a tendency for the desquamation in the control cases to be generalized and marked, while in the serum-treated cases the tendency is definitely toward localized and mild desquamation:

Character of desquamation	Number	Control group	Treated with antitoxin A or B	
			Number	Per cent
		Per cent		
Absent	0	0.0	6	5.6
Localized and mild	7	8.8	47	43.1
Localized and moderate	0	0.0	7	6.4
Localized and marked	0	0.0	1	0.9
Generalized and mild	16	20.3	13	11.9
Generalized and moderate	22	27.9	22	20.2
Generalized and marked	34	43.0	13	11.9

TEMPERATURE

The hospital routine required that the patient's temperature should be taken every four hours during the definitely febrile period and thereafter at 6 a. m. and 2 p. m. For the purposes of tabulation and comparison the temperature readings reported in this study represent the mean morning and afternoon temperatures. In order to provide further uniformity a mean half day temperature in the control group was not recorded until it represented the mean of the three required readings for the half day. Similarly in the antitoxin-treated groups, the tabulation of the temperatures began on the first full half day of readings following the injection of the antitoxin. This gives entirely comparable readings both between individual cases and also between the three groups. By requiring a full half day's mean for the first recorded reading following the administration of antitoxin there has been eliminated the immediate rise which sometimes follows an injection of serum.

The mean morning and afternoon temperatures for each patient in the study series are reported in Table 9 as the group average morning and afternoon temperatures for the corresponding day of the disease. As explained in the previous paragraph, the first recorded half day of temperature in the serum-treated groups represents the mean of the first half day of temperature readings following the administration of antoxin. Differences between the control and serum-treated groups are not striking. It will be observed from Table 9 that the highest mean temperature in the control group scarcely exceeded 101° F., and this only on two afternoons. The mean temperatures in the serum-treated groups are only slightly different.

TABLE 9.—*The mean morning and afternoon temperatures of all cases included within the groups designated, irrespective of age, severity of disease, or the development of complications*

Day of disease	Control group, mean of 82 cases		Combined A and B groups, mean of 104 cases		Group treated with—			
					Antitoxin A		Antitoxin B	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
First	-------	-------	-------	-------	-------	-------	-------	-------
Second	-------	101.3	101.7	101.5	102.0	101.7	-------	-------
Third	100.7	101.3	100.5	100.7	101.0	100.9	99.5	100.2
Fourth	100.4	100.7	99.9	100.2	100.1	100.4	99.5	99.8
Fifth	99.8	100.1	99.4	99.7	99.7	99.8	99.1	99.6
Sixth	99.4	99.8	99.0	99.5	99.1	99.6	99.0	99.4
Seventh	99.2	99.6	98.9	99.6	99.1	99.7	98.9	99.7
Eighth	98.9	99.2	99.0	99.5	99.1	99.5	99.0	99.6
Ninth	98.6	99.2	98.8	99.2	98.9	99.3	98.7	99.2
Tenth	98.5	99.1	98.7	99.0	98.7	99.0	98.8	99.3
Eleventh	98.4	98.9	98.5	98.9	98.5	99.0	98.5	98.9
Twelfth	98.2	98.8	98.4	98.8	98.4	98.8	98.4	98.9
Thirteenth	98.2	98.7	99.2	98.2	98.3	98.7	98.2	99.0
Fourteenth	98.1	98.7	98.2	98.9	98.1	98.7	98.6	98.9

The control and serum-treated groups were not entirely similar in that the distribution of cases according to apparent severity on admission and according to age was not the same. Correction should be made for these two factors. This has been accomplished in Table 10, which contains a record of the mean temperatures on groups of patients, the severity of whose illnesses was recorded as moderate on admission and whose ages ranged from 5 to 15 years, both inclusive. A study of this table fails to reveal differences in the mean temperatures between the control and serum-treated groups which are any more significant than is shown by the evidence contained in Table 9.

TABLE 10.—*The mean morning and afternoon temperatures of a group of scarlet fever patients ranging in age from 5 to 15, both inclusive, who were regarded as moderately ill on admission and who developed no complications other than serum sickness during the course of the disease, cases grouped according to treatment given*

Day of disease	Control group, mean of 25 cases		Group treated with antitoxin					
			A or B, mean of 44 cases		A only		B only	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
First								
Second								
Third	101.1	101.5	100.3	100.1	100.8	100.6	99.5	100.3
Fourth	100.5	100.6	99.6	99.9	99.8	100.1	99.4	99.8
Fifth	99.6	99.8	99.1	99.5	99.3	99.6	98.8	99.5
Sixth	99.2	99.6	98.7	99.2	98.8	99.2	98.5	99.0
Seventh	98.9	99.2	98.7	99.5	98.9	99.6	98.5	99.4
Eighth	98.6	98.9	98.8	99.5	99.1	99.6	98.4	99.2
Ninth	98.3	99.0	98.6	99.0	99.1	99.3	98.1	98.7
Tenth	98.1	98.8	98.5	98.9	98.7	98.9	98.2	98.8
Eleventh	98.1	98.7	98.1	98.7	98.3	98.8	98.0	98.6
Twelfth	97.9	98.6	98.2	98.6	98.2	98.6	98.2	98.2
Thirteenth	97.9	98.6	98.1	98.6	98.2	98.5	97.8	98.9
Fourteenth	97.6	98.5	98.1	98.8	97.8	98.8	98.4	98.9

It may be that the cause of fever in persons ill with scarlet fever is not exclusively due to a specific toxemia. Direct extension of the hemolytic streptococcus infection and the associated infection of the throat with other organisms may also assist in the production of fever. If such a supposition is correct, it then follows that the portion of the fever which is due to the specific toxin is in direct relation to the height of the fever. Therefore it would seem logical that the most pronounced results of specific sero-therapy should be obtained in patients who show the most pronounced toxic symptoms. In order to permit a study of the fever curve in a more toxic group of cases, a tabulation has been arranged in Table 11, which includes only such cases as showed an admission temperature of 101° F. or more. It will be seen from the footnote to this table that the cases included in the three groups are almost identical as to the mean admission temperatures and the duration of the disease. The resultant temperature reductions in the two serum-treated groups are very slight, being somewhat more pronounced in antitoxin B group.

Table 11.—*The mean temperatures of control and treated cases, each case of which on admission had a temperature of 101° F. or higher, recorded as the day of disease*

Day of disease	Control group		Antitoxin A		Antitoxin B	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
First						
Second						
Third	101.1	101.7	101.2	101.4	99.6	100.4
Fourth	100.9	101.1	100.5	100.7	99.8	100.0
Fifth	100.3	100.5	99.9	100.0	99.2	99.8
Sixth	99.9	100.2	99.2	99.8	99.1	99.6

Mean admission temperatures: Control, 102.5; antitoxin A, 102.7; antitoxin B, 102.3. Mean duration of disease when temperature readings began: Control, 3.5 days, antitoxin A, 3.6 days; antitoxin B, 3.8 days. Number of cases included: Control, 45; antitoxin A, 43; antitoxin B, 28.

The data given in Table 11 have been further restricted in Table 12 so as to include only the temperature records of those patients who received their antitoxin injection on or before the fourth day of the disease. The method of tabulating the temperature has been changed from the day of the disease to the day of temperature recording, which in the case of the control group dates from the first half day following admission to the hospital and for the serum treated groups from the first half day following antitoxin administration.

The data presented in the footnote to Table 12 indicate that the cases included within the three groups were very similar as to the temperature on admittance and the duration of disease.

The first recorded temperature reading in antitoxin A group is higher than the corresponding reading in the control group. Actually 27 per cent of the individual patients treated with antitoxin A showed a mean temperature for the first half day following antitoxin administration which was higher than their admission temperatures. These initial elevations may, however, have been due to the considerable volume of the antitoxin (foreign protein) injected. No similar elevations developed in the antitoxin B group and it will be observed from Table 12 that the mean temperature readings in the antitoxin B group are somewhat lower than either those in the control or the antitoxin A groups.

Table 12.—*The mean temperatures of control and treated cases, each case of which on admission had a temperature of 101° F. or higher and a disease duration of not more than four days*

[Mean temperatures are recorded as the day of temperature readings since admission irrespective of the actual duration of the disease]

Day of temperature record	Control group		Antitoxin A		Antitoxin B	
	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
First	101.3	101.7	101.6	101.5	100.2	100.2
Second	100.8	100.9	100.4	100.7	99.1	99.8
Third	100.1	100.4	99.4	99.8	99.3	99.7
Fourth	99.7	100.0	99.1	99.7	98.9	99.5
Fifth	99.4	99.7	99.2	99.8	98.8	99.4
Sixth	99.1	99.4	99.3	99.6	98.7	99.1

Mean admission temperatures: Control, 102.5; antitoxin A, 102.8; antitoxin B, 102.4. Mean duration of disease when temperature readings began: Control, 3.2 days; antitoxin A, 3.1 days; antitoxin B, 3.4 days. Number of cases included: Control, 41; antitoxin A, 33; antitoxin B, 20.

COMPLICATIONS

The severity of scarlet fever has diminished to such an extent in most sections of the United States that the probability of a fatal termination has become greatly minimized. Complications continue to develop in a fairly high percentage of cases, and, therefore, are more to be feared than the chances of death itself. In addition to the knowledge that complications frequently occur during the period of convalescence there is the uncertainty as to what organic damage such a toxemia may have produced in the patient which will not become apparent until later in life.

Otitis media represents the most frequently occurring major complication in the control series. (Table 13.) A total of 14 cases developed simple catarrhal otitis media in one or both ears, of which number 6 went on to suppuration and one of these 6 extended to a mastoid infection requiring surgical intervention. Similarly in the 110 patients treated either with antitoxin A or B there developed 8 cases of catarrhal otitis media, of which number 4 went on to suppuration. One of these four suppurative otitis cases was reported to have had chronic otitis media before the onset of the scarlet fever. However, there was no discharge from the ear on admission.

TABLE 13.—*A record of the complicating diseases developing in the scarlet fever patients included in the three study groups*

Complications	Control group		Patients treated with antitoxin					
			A or B		A		B	
	Number	Mean duration	Number	Mean duration	Number	Mean duration	Number	Mean duration
Total cases in each group	82	------	110	------	73	------	37	------
Otitis media, suppurative, bilateral	1	50	1	43	1	43	------	------
Otitis media, suppurative, unilateral	5	38	3	27	3	27	------	------
Otitis media, nonsuppurative, bilateral	3	10	3	16	2	15	1	19
Otitis media, nonsuppurative, unilateral	5	3	1	6	1	6	------	------
Mastoiditis with operation	1	35	0	------	------	------	------	------
Adenitis, cervical	16	22	6	31	3	25	3	38
Adenitis, cervical suppurative	0	------	1	32	1	32	------	------
Arthritis, toxic	5	3	0	------	------	------	------	------
Early albuminuria	7	2	9	2	6	2	3	1
Early albuminuria with hematuria	1	3	0	------	------	------	------	------
Late albuminuria with hypertension	0	------	1	57	1	57	------	------
Late albuminuria with hematuria	7	25	0	------	------	------	------	------
Late albuminuria with hematuria and casts	3	34	0	------	------	------	------	------
Sinusitis	3	15	0	------	------	------	------	------
Rhinitis, purulent	2	27	2	------	1	------	1	17
Stomatitis, ulcerative	1	31	0	------	------	------	------	------
Tonsillitis, acute	4	6	2	7	1	2	1	12
Paronychia	3	24	3	------	2	------	1	5
Acute bronchitis	1	10	1	19	------	------	1	19
Acute pharyngitis	1	3	0	------	------	------	------	------
Upper respiratory infection	1	6	3	6	3	6	------	------
Abscess peri-tonsillar	0	------	2	3	2	3	------	------
Abscess peri-rectal	1	23	0	------	------	------	------	------
Impetigo bullosa	0	------	1	33	1	33	------	------
Infection of finger	1	15	1	4	1	4	------	------
Infection of lip	1	27	0	------	------	------	------	------

Using the 14 cases occurring in the control series as the expectancy when serum is not used, there should then have occurred in the serum-treated groups 19 cases of simple catarrhal otitis, and of these 8 should have suppurated.

In the control group the day of onset of simple catarrhal otitis symptoms varied from the first to the thirty-seventh day of the disease (mean eleventh day), whereas those going on to suppuration developed their first symptoms on the fifth to the thirty-seventh day of the disease. In the serum-treated series simple catarrhal otitis developed on the fifth to the fifty-ninth day (mean twentieth day), and those ears which ultimately suppurated developed their simple otitis on the fifteenth to fifty-ninth day.

Nephritis was the second most frequently occurring major complication. Early simple albuminuria is not considered as an indication of actual renal damage, but an occurrence common to any acute febrile condition. Seven such early cases did occur in the 82 control cases as against 9 in the 110 serum-treated cases. One case of late albuminuria with an occasional cast and no hematuria, but with definite hypertension, did develop in the serum-treated cases. No similar case occurred in the control group. There developed 10 cases of late albuminuria with hematuria, with or without casts, in the control series while no case of this type appeared in the serum-treated groups against an expectancy of 13 such cases.

Arthritis.—Five cases of so-called "scarlatinal rheumatism" developed in the 82 patients of the control series against no cases among the 110 treated patients (expectancy 7 cases). The symptoms consisted of local swelling, heat, and tenderness with no indication of fluid formation in the joint. The signs appeared on the eleventh day (range sixth to twenty-first day) and persisted for an average of 3 days (range 1 to 6 days). The involved joints included both wrists in 2 cases, both knees in 1, both wrists and one thumb in 1, and wrist, elbow and knee in 1 case. Recovery was complete in all cases.

Adenitis.—A mild general adenopathy appeared in practically every case early in the acute stage. Sixteen cases in the control group developed enlarged cervical glands which were out of proportion to any signs in the fauces, and these were considered as true complications of the disease itself. The earliest time of definite localization was on the third day of the disease, and the latest on the thirty-first day (mean twelfth day). Similar enlargement of the glands developed in 7 patients of the serum-treated series as against an expectancy of 21. One of the seven cases developed fluctuation in the enlarged gland. It was, therefore, incised and a small amount of sero-purulent discharge resulted.

Other complications.—Other ailments developed during the convalescing period (Table 13), some of which may be regarded as true

scarlet-fever complications, while others are only incident to debilitation of any sort. The more significant were as follows: Clinically evident *sinusitis*, 3 cases in the control series and none in the serum-treated; *purulent rhinitis*, 2 in the control and a like number in the serum-treated; *ulcerative stomatitis*, 1 in the control and none in the serum-treated; and *acute tonsillitis*, 4 in the control and 2 in the serum-treated series.

The percentage distribution of the major complications occurring in the control and serum-treated series as reported in Table 13 are as follows:

Complication	Control group	Combined serum-treated group
	Per cent	*Per cent*
Cervical adenitis	19.5	6.4
Otitis media, all types	17.1	7.3
Otitis media, suppurative	7.3	3.6
Mastoiditis	1.2	0.0
Nephritis	12.2	0.9
Arthritis, toxic	6.1	0.0

REPORT OF SPECIAL CASES

The convalescence of case Q 3468 was uneventful until the nineteenth day of the disease, when measles developed. The subsequent clinical course proved very stormy, which can be entirely explained as complications of the measles infection, but from which the possible influence of the earlier scarlet fever infection can not be entirely eliminated. The case should have been omitted from our series; but because it fell into one of the antitoxin groups, we are reporting the facts in detail, thereby permitting the reader to form his own conclusions. The case, however, has been omitted from all tabulations.

Case Q 3468.—White; female; age, 4 years; was admitted at 11.30 p. m. on March 23, 1931, which was the first day of symptoms. Examination on admittance showed an average toxic case of scarlet fever. Temperature, 102.8° F.; pulse, 140; respirations, 48; and white blood count, 15,600. Within 12 hours 5,000 units of scarlet fever streptococcus antitoxin B were given. The temperature gradually subsided, so that from April 4 to 9, both inclusive, the temperature remained normal and other signs of the scarlet fever infection were greatly lessened. Fever began again on April 10, and on the following day a maculopapular eruption appeared, particularly on the extremities. Up until April 16 the ears had remained free from signs of infection, but now the right drum appeared red and bulging. Paracentesis resulted in a profuse purulent discharge. Definite Koplik's spots appeared on April 19, and on the same day the left drum showed redness and bulging. Paracentesis was followed by a profuse purulent discharge. The patient continued to run a septic temperature, and on May 1 there were physical and X-ray signs of acute pulmonary infection. A question of pulmonary abscess formation also arose. The white blood count was now 29,500. Against the advice of the attending physician the patient was removed

from the hospital on May 6. The patient was returned to the hospital May 28 by the parents because of pain in both ears, particularly the left. On June 8 a right mastoidectomy was performed, and on June 23 a similar operation on the left. The child was discharged on July 9, 1931, apparently well.

The first 18 days of this infection indicated a case of scarlet fever with a favorable prognosis. The appearance of a measles infection on the nineteenth day, accompanied by bilateral suppurative otitis media and followed by signs of general septicemia and localized pulmonary infection, greatly alters the picture. It is our opinion that the developments following the eighteenth scarlet fever day must be attributed primarily to the measles infection, though aggravated, perhaps, in part by the debilitating effect of the recent attack of scarlet fever.

Three cases terminated fatally. The circumstances and clinical aspects in these three instances differed considerably from others admitted to our series, and we are therefore reporting each case record in abstract form but excluding each from all tabulations.

Case P 14030.—White, male, age 9½ years, admitted on the fifth day of the disease with a temperature of 105° F., pulse 148, respirations 48, and white blood count 21,500. The patient was delirious and had a very intense generalized skin eruption which was hemorrhagic in places. The tonsils and pharynx showed signs of a severe infection. The lungs were clear. The heart was not enlarged, its rate was very rapid and regular, with sounds of fair quality. There was no definite evidence of meningeal involvement. The left knee joint was larger than the right. The skin of left thigh was mottled and felt warmer than the right. The left thigh was tender to deep pressure over the femur. There was a loss of sphincter control. An admission diagnosis of *scarlet fever, severe septic type,* was made, complicated by arthritis of left knee with the possibility of an acute osteomyelitis of the left femur.

TREATMENT: The patient was immediately given two therapeutic doses of scarlet fever streptococcus antitoxin A intramuscularly followed by 40 c. c. of convalescent scarlet fever serum intravenously.

TERMINATION: The patient steadily grew worse and died 6¼ hours after admission to the hospital.

Case P 14054.—White; male; age 8 years; admitted to the hospital on the sixth day of the disease with a temperature of 104° F., pulse 164, and respirations 32. The onset was abrupt and severe. The patient was delirious on the second day of the disease and much worse on the fifth day, when he became unable to swallow. He was in a stuporous condition from which he was aroused with difficulty.

PHYSICAL EXAMINATION: There was an intense skin eruption with a cyanotic flush. The tongue was swollen and dry, with a black exudate. The buccal surfaces were dull red, with ulcerations. The pharynx was injected and ulcerated. The tonsils were injected and ulcerated, with an extensive necrotic membrane, and there was also a post-pharyngeal membrane. The nose showed profuse muco-purulent discharge, with ulcerations and membrane on the nasal mucosa. The left ear drum was injected and slightly bulging. There was profuse purulent discharge from the right ear. The cervical lymph nodes were enlarged and tender. Auscultation revealed a few râles in the lungs. The heart was not enlarged, but rapid, with sounds of fair quality. On admission a diagnosis of *scarlet fever, severe septic type,* was made, complicated by rhinitis, sinusitis (?) (or pansinusitis), cervical adenitis, suppurative otitis media, pharyngitis, tonsillitis, and a question of beginning pulmonary infection. The total white count was 51,000, with 84 per cent polymorphonuclears, 9 per cent lymphocytes, and 7 per cent large mononuclears.

TREATMENT: 24,000 units of scarlet fever streptococcus antitoxin A were given intramuscularly. Intravenous glucose solution was administered and local medication was applied to the throat.

TERMINATION: Two days later the general condition seemed improved, though the patient was still very ill. The prognosis was questionable. The heart was now apparently slightly enlarged to the left; the sounds were distant and the rate was rapid, but there were no murmurs. The mean temperature for this p. m. was 100.9° F., pulse 140, and respirations 28. An additional diagnosis of toxic myocarditis was made. The patient died 66 hours after admission, probably from cardiac failure.

Case Q 3528.—White, female, age 10 years, admitted to the hospital on the second day of the disease and the first day of the rash, with a temperature of 106° F., pulse 148, respirations 42, and white blood count 9,000. The patient was semidelirious and appeared extremely ill. An intense generalized rash was present. Otherwise physical findings on admission were not unusual. On the second hospital day the patient vomited repeatedly with a show of blood in the vomitus. The rash had now disappeared and the patient looked very pale. The heart was not enlarged, but the sounds were weak. On admission, a diagnosis of *scarlet fever, severe toxic type,* was made, complicated by a toxic myocarditis. The rash had disappeared by the afternoon of the first hospital day (12 to 18 hours after antitoxin).

TREATMENT: About one week prior to onset, the patient had received a prophylactic dose of scarlet fever streptococcus antitoxin. On admission, this case normally fell into the control group of the study series; but because of the evident desperate character of the illness, 6,000 units of antitoxin A were given immediately upon admission. This was accompanied by glucose infusions, and on the second hospital day a human blood transfusion of 200 c. c. was given.

TERMINATION: The temperature fell to 103° F. by 6 a. m. on the second hospital day, but by 9 p. m. on that day it had risen to over 106° F. The pulse was 140 at 6 a. m. and by 9 p. m. it was more than 180, with weak heart sounds. The condition steadily grew worse and the patient died 30 hours after admission.

NOTE: The history of serum administration in this case is of interest and may also have some relation to the severity and termination of this case. In 1929 the patient received the usual immunizing doses of diphtheria toxin-antitoxin mixture. On March 18, 1931, a prophylactic dose of scarlet fever streptococcus antitoxin was given. The patient became ill of scarlet fever on March 24. Between 11.30 p. m. on March 25 and 2.30 a. m. March 26, 6,000 units of antitoxin A, representing a volume of about 20 c. c. of concentrated serum, was given intramuscularly. On the afternoon of March 26 the patient complained of pain in the injected buttock. The area surrounding the site of the needle insertion was greatly swollen, firm, tender to touch, and had a hemorrhagic appearance, the center of which suggested early necrosis. The patient died at 4.50 a. m. on March 27, which was 30 hours after admission.

The early fatal termination of this case prevented observation of the entire reaction in the injected buttock. At the time of death the reaction gave evidence of a beginning Arthus phenomenon. The severity of the illness in this case was far greater than usual, and the clinical manifestations were in some respects not typical of scarlet fever. As later information revealed, this patient received the therapeutic dose of antitoxin seven days after an injection of a prophylactic dose. On admission, the symptoms were probably largely due to a developing serum sickness, particularly since it had previously been sensitized to horse serum by the diphtheria T-A mixture given in 1929. The evidence further very strongly suggests that this child possessed a peculiar tissue hypersensitivity similar to the cases reported by Gatewood and Baldridge (8).

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SERUM THERAPY

THERAPEUTIC EFFECT

Specific serum therapy in the treatment of scarlet fever is rationalized at the present time by the rather general belief that scarlet fever is a disease produced by a hemolytic streptococcus which, in turn, is capable of elaborating a true exotoxin, the disease abating when there is present sufficient antitoxin to neutralize the toxin. The Schultz-Charlton blanching test, the Dick intradermal test, toxin-antitoxin neutralization tests performed on susceptible individuals, and the work of Blake (9), Blake and Trask (10), and Birkhaug (11), all tend to confirm this theory. However, what portion of the elevated temperature during the acute stage is the result of reaction to the toxin and what portion, if any, to direct bacterial invasion, either with the hemolytic streptococcus of scarlet fever or some pyogenic organism, is a question which still remains to be solved. It probably can be said with certainty that the influence of the exotoxin in sustaining an elevated temperature diminishes as the disease progresses.

The clinical data accumulated as a result of our studies fail to build up an irrefutable case for the use of scarlet fever streptococcus antitoxin in the treatment of scarlet fever. However, a study of the data presented does show that the antitoxin has a specific action. It may well be that failure to obtain complete and constant results was due to inadequate dosage, delayed administration, or to an improper mode of injection.

The mean duration of the eruption in the combined serum-treated groups (Table 3) was 4.4 days, as against 6.8 days in the control group. On an average, the eruption was in its second day (i. e., about 24 hours after its appearance) when the antitoxin was injected. Thus the eruption actually remained for slightly more than 3 days after administering antitoxin.

Apparently antitoxin had no influence on the time interval before desquamation began (Table 5), nor did it have a pronounced influence on the duration of the desquamating period (Table 6). The average desquamating period in the combined serum-treated group continued for 21 days, and in the control series for 26 days. Twenty-three and three-tenths per cent of 107 serum-treated cases completed their desquamation in 14 days or less, while only 1.3 per cent of the control cases equaled this record.

The character and extent of the desquamation showed a very pronounced difference between the serum-treated and control groups, as will be seen from Tables 7 and 8 and the tabulation on page 3031. The character of the desquamation in the combined serum-treated group was recorded as *marked* in 12.8 per cent, *moderate* in 26.6 per cent *mild* in 55.1 per cent and *absent* in 5.5 per cent. Corresponding figures

for the control group are 41.8, 27.8, 30.4, and 0.0 per cent, respectively. Similarly, the extent of the desquamation in the combined serum-treated group was *generalized* in 44.0 per cent, *localized* in 50.5 per cent, and *absent* in 5.5 per cent, in contrast to 91.1, 8.9, and 0.0 per cent, respectively, in the control group. These differences are even more strikingly shown by the figures given in the text on page 3031. These show a definite trend for the desquamation to be localized and mild in the serum-treated cases as against generalized and marked in the control cases.

An analysis of the temperature readings in the serum-treated and control groups as recorded in Tables 9, 10, 11, and 12 fails to reveal any definite febrile reductions following the administration of antitoxin. Certain individual cases did show a pronounced reduction from the admission temperature following the injection of antitoxin, but equally great reductions occurred in certain control cases without other treatment than rest in bed.

In the absence of a relatively high scarlet fever mortality rate, the next best measure of the real value of antitoxin in the treatment of this disease is the effect produced on the occurrence of major complications. What this effect has been in our study group may be determined through an analysis of the data in Table 13. In the 82 control cases there were 10 cases of nephritis, 5 of toxic arthritis, 16 of cervical adenitis, 3 of clinically evident sinusitis, and 14 of all types of otitis media, of which last number 6 went on to suppuration with 1 developing mastoiditis. Using these figures as the normal expectancy for the entire group, there should have developed in the 110 treated cases 13 cases of nephritis, 7 of toxic arthritis, 21 of cervical adenitis, 4 of sinusitis, and 19 of all types of otitis media, of which 8 should have suppurated with 1 or possibly 2 of these developing mastoiditis. Actually there developed in the 110 serum-treated cases 1 case of nephritis, no cases of toxic arthritis, 7 cases of cervical adenitis, no cases of sinusitis, and 8 cases of all types of otitis media, of which 4 went on to suppuration. No mastoid infections developed. This gives a total of 48 major complications occurring in 31 patients of the control group, which equals an expectancy of 64 complications in 42 patients for the serum-treated group. There actually developed only 16 major complications in the serum-treated patients and these were restricted to 12 individual patients. Thus 37.8 per cent of the control patients were involved in at least one complication, as against 10.9 per cent of the serum-treated patients. Correspondingly, the serum-treated patients show a 75 per cent decrease in the major complication expectancy and a 71.4 per cent decrease in the expected number of serum-treated patients to be involved.

TABLE 14.—*A detailed record of certain cases treated with antitoxin and which later developed secondary diseases which may be definitely regarded as complications of the scarlet fever infection*

Case No.	Age	Sex	Apparent severity on admission	Duration of rash	Duration of desquamation	Complication	Day of disease antitoxin was given	Temperature on days following the administration of antitoxin: First, A. M.	First, P. M.	Second, A. M.	Second, P. M.	Third, A. M.	Third, P. M.	Fourth, A. M.	Fourth, P. M.	Fifth, A. M.	Fifth, P. M.	Sixth, A. M.	Sixth, P. M.
Q 1106	6	F.	Mod.	3		Sup. otitis media-sup. cer. adenitis	First	102.9	101.6	100.8	101.4	99.3	100.7	99.6	100.6	100.4	100.6	100.1	101.0
Q 2206	2	F.	Mod.	7	24	Sup. otitis media-cervical adenitis	Third	102.6	102.3	100.7	100.5	99.1	99.3	98.6	99.4	99.0	99.1	98.6	99.6
Q 4943	4	M.	Mod.	5	24	do.	Fifth	100.7	102.0	101.1	101.1	99.9	100.6	99.9	101.8	100.6	101.3	98.9	101.1
Q 2717	3	F.	Sev.	7	25	Nonsup. otitis cervical adenitis	Sixth	101.7	100.1	99.5	103.3	103.6	102.9	103.1	103.5	103.4	103.3	102.5	102.5
Q 5461	11	F.	Mod.	4	28	Sup. otitis media	Fourth	100.4	100.3	99.9	100.7	98.7	100.0	98.8	100.8	99.0	100.0	98.4	99.0
P 13873	5	M.	Mod.	4	27	Nonsup. otitis media	Third	101.0	101.7	100.1	100.3	99.8	100.1	100.7	101.5	100.7	101.0	101.0	100.3
Q 1471	2	M.	Mod.	6	30	do.	Fourth	101.0	100.9	99.9	100.0	99.1	98.9	99.2	99.2	99.2	99.2	99.3	98.9
Q 2742	5	M.	Mod.	6	6	do.	Third		102.3	103.3	99.6	100.0	100.5	99.6	102.0	98.0	100.3	97.8	98.4
Q 5194	3	F.	Mod.	2	36	Cervical adenitis	Fourth	101.2	101.7	100.0	101.1	100.1	99.8	98.6	99.3	98.6	98.9	99.6	99.0
Q 5274	3	F.	Mod.	6	12	do.	Second	102.7	102.8	99.8	100.5	99.5	100.0	98.3	98.3	98.0	98.8	102.6	101.7
Q 2478	2	F.	Sev.	9	43	do.	Fifth	100.8	101.3	100.4	101.5	100.5	100.9	100.7	99.3	99.3	100.0	97.9	98.8
Q 2924	21	F.	Mod.	3	14	Albuminuria with hypertension	First	100.7	100.6	99.9	100.3	98.0	100.0	97.8	99.0	97.2	99.2	97.8	99.0
Mean				5	25		Third	101.4	101.4	100.4	100.8	99.8	100.3	99.5	100.3	99.4	100.1	99.5	99.9
Mean for all moderate and severe treated cases				4	21		do.	101.6	100.6	99.7	100.0	98.1	99.6	98.9	99.5	98.9	99.5	99.0	99.4

Presumably the use of antitoxin failed to prevent the occurrence of the 16 complications occurring in the 12 serum-treated patients. A more detailed analysis of these 12 cases is made in Table 14. All were considered moderately ill on admission, except two who were reported severely ill. In spite of this impression on admission it will be seen that the mean duration of the skin eruption exceeded the mean for all moderate or severe serum-treated cases, and the individual temperatures remained sufficiently high following treatment to give a mean for these 12 cases which is higher than the mean for all serum-treated cases. The day of the disease on which antitoxin was injected varied in a manner similar to that of the entire serum-treated group. The combined evidence given in Table 14 suggests that these 12 cases may have been more acutely ill than the average for all the serum-treated cases and that the antitoxin failed to effect prompt and complete neutralization.

SERUM COMPLICATIONS

It is of the utmost importance to realize that the administration of a foreign serum by any hypodermic injection method is not entirely free from danger. The frequency of serum sickness and the less frequent occurrence of more serious developments following serum therapy is of sufficient moment to cause the observing clinician to weigh carefully the consequences before adopting such a method. The therapeutic results must definitely outweigh the reaction produced or the chance of more serious complication.

Gordon and Creswell (12) have studied the frequency of serum sickness following the use of both diphtheria and scarlet fever antitoxin. Their findings are very illuminating in view of the frequently made statement that scarlet fever antitoxin is particularly likely to cause serum sickness. If patients had previously received toxin-antitoxin mixture, 75.3 per cent developed serum sickness following scarlet fever antitoxin, and 73.5 per cent following diphtheria antitoxin. Further, those having had toxin-antitoxin injections constituted 37.6 per cent of all scarlet fever patients and only 18.1 per cent of the diphtheria patients. In the entire group of patients treated, 55.3 per cent of the scarlet fever patients and 76 per cent of the diphtheria patients were presumably nonsensitive to horse serum on admission. Gordon and Creswell observe that, if allowances are made for these sensitization differences, the frequency of serum sickness following the injection of either diphtheria or scarlet fever antitoxin is very nearly the same.

In 107 of our group of scarlet fever patients treated with either antitoxin A or antitoxin B, 71, or 66.3 per cent, developed serum sickness of varying degrees of severity. The relation of serum sick-

ness to the two antitoxins used and to the history of previous injections of horse serum is given in Table 15.

TABLE 15.—*A record of the occurrence of serum sickness among those patients treated with either scarlet fever streptococcus antitoxin A or B*

Patient's history	Severity of serum sickness	Antitoxin A		Antitoxin B	
		Number	Per cent	Number	Per cent
Had received horse serum previous to present illness.	No reaction	4	11.4		16.7
	Mild reaction	9 } 31	88.6	0 } 10	83.3
	Moderate reaction	11		3	
	Severe reaction	11		7	
Total		35	100.0	12	100.0
Had received no horse serum previous to present illness.	No reaction	8	33.3	21	84.0
	Mild reaction	5 } 16	66.7	2 } 4	16.0
	Moderate reaction	8		1	
	Severe reaction	3		1	
Total		24	100.0	25	100.0
Patient uncertain as to history of horse serum.	No reaction	1			
	Mild reaction	3 } 10			
	Moderate reaction	6			
	Severe reaction	1			
Total		11			

If the patient had previously received horse serum in any form, such as diphtheria toxin-antitoxin mixture, diphtheria antitoxin, tetanus antitoxin, antimeningococcus serum, and the like, there was an 87.2 per cent chance (antitoxin A 88.6 per cent and antitoxin B 83.3 per cent) that he would develop serum sickness following the administration of scarlet fever antitoxin. There was a 38.3 per cent possibility that this reaction would be severe. However, if the patient had at no time previously received horse serum in any form, the chance of developing serum sickness was 40.8 per cent (with antitoxin A 66.7 per cent and with antitoxin B 16.0 per cent). In this group the serum sickness reaction was severe in 8.2 per cent of those injected.

Of the 47 patients who previously had received horse serum in any form, 34 had received only such amount as is contained in the three immunizing doses of diphtheria toxin-antitoxin mixture, and of this number 29, or 85.3 per cent (antitoxin A 88.5 per cent and antitoxin B 75.0 per cent), developed serum sickness following the injection of scarlet fever antitoxin, 13 of whom were severely ill. Some persons had received the toxin-antitoxin mixture as recently as two months prior to the scarlet fever antitoxin and others as much as 10 years previously, both extremes developing serum sickness.

THERAPEUTIC VARIATIONS WITH ANTITOXINS A AND B

The differences in the two antitoxins used were discussed in detail in an earlier section of this report. It will be recalled that antitoxin A was a concentrated antiserum produced with the combined sterile

antigen prepared with four separate hemolytic streptococcus cultures. It possessed a potency of 360 to 400 units per cubic centimeter, and the volume of the individual therapeutic dose measured slightly more than 20 c. c. On the other hand, antitoxin B was an unconcentrated antiserum prepared with a single culture of hemolytic streptococcus. It showed a potency of approximately 800 units per cubic centimeter, with the volume of the individual dose measuring 8 c. c.

The mean duration of the period of eruption in those moderately ill and treated with antitoxin A was 4.4 days (Table 3) and the mean duration of the period of desquamation was 22.3 days (Table 6). Similar figures for a like group of cases treated with antitoxin B were 4.2 and 19.3 days, respectively. The character of the desquamation in the two groups of moderately ill cases was mild or absent in 67.7 per cent of the antitoxin A cases, as against 50.0 per cent in the antitoxin B cases. (Table 7.) Similarly, the extent of the desquamation was localized or absent in 59.7 and 43.8 per cent, respectively. (Table 8.) Desquamation failed to appear in 1.6 per cent of the antitoxin A cases, as against 9.3 per cent with antitoxin B.

Complications developed in patients treated with either antitoxin. If we combine those complications which in a previous section of this report were referred to as major complications, namely, otitis media of all types, nephritis, cervical adenitis, toxic arthritis, and sinusitis, we find that 12 such complications developed in antitoxin A group. (Table 13.) Using this as the normal expectancy for serum-treated groups the expectancy for the patients treated with antitoxin B becomes 6 complications as against 4 which actually developed. Further, of these 4 complications 3 were simple cervical adenitis and 1 nonsuppurative catarrhal otitis, whereas there were among the 12 complications occurring in the antitoxin A series 4 instances of suppurative otitis, 1 of nephritis, and 1 of suppurative cervical adenitis.

Differences in the mean temperature readings in the two groups were very slight. The readings for all cases have been tabulated in Table 9 and again in Table 10, the latter comprising more nearly comparable cases. It was thought that possibly something more striking might be demonstrated if the case records used in Table 10 were retabulated on the basis of the day of antitoxin rather than the day of disease. Such an arrangement is given in Table 16, which shows essentially the same temperature distribution as in Tables 9 and 10. The mean temperatures for a group of cases with a minimum admission temperature of 101° F. and a disease duration of four days or less (Table 12) indicate an appreciably greater temperature reduction following antitoxin B than was obtained with antitoxin A.

TABLE 16.—*The temperature readings of a group of scarlet fever patients who were treated with antitoxin A or B, tabulated as days following the administration of antitoxin without regard for the actual day of the disease*

[Patients are 5 to 15 years of age, both inclusive, and were considered moderately ill on admission]

Day of antitoxin	Treated with antitoxin A		Treated with antitoxin B		Day of antitoxin	Treated with antitoxin A		Treated with antitoxin B	
	A. M.	P. M.	A. M.	P. M.		A. M.	P. M.	A. M.	P. M.
First	100.9	100.9	99.9	100.0	Seventh	98.8	99.2	98.1	98.9
Second	99.7	99.8	98.8	99.5	Eighth	98.6	98.9	98.0	98.6
Third	98.9	99.4	98.8	99.5	Ninth	98.4	98.7	97.8	98.5
Fourth	98.7	99.3	98.4	99.2	Tenth	98.1	98.7	98.1	98.7
Fifth	98.8	99.4	98.6	99.3	Eleventh	98.0	98.6	97.9	98.8
Sixth	99.0	99.3	98.2	98.9	Twelfth	98.0	98.8	99.1	99.3

The frequency of serum sickness in these two groups of cases was more at variance. (Table 15.) If the patient had previously received horse serum, the chance of his developing serum sickness following the administration of scarlet fever antitoxin of either type was essentially the same. However, in those patients who had never been sensitized to horse serum, 66.7 per cent developed serum sickness following the use of antitoxin A and only 16 per cent following the use of antitoxin B. It will be remembered that there are two differences in the antitoxins used: Antitoxin A was concentrated and given in a volume of 20 c. c.; antitoxin B was unconcentrated and required only 8 c. c. per dose.

DOSAGE

The question of the correct dosage can not be properly determined until more accurate knowledge is at hand as to the amount of toxin elaborated in various types of the infection; also whether the elaboration of toxin is limited to a few days at the outset of the disease or continued throughout the febrile period. The collection of such data becomes extremely difficult, because of the absence of suitable laboratory methods for measuring both toxin and antitoxin. Dick and Dick (13) report the production of a typical scarlet fever rash following the subcutaneous injection of 0.1 c. c. of undiluted toxin. However they do not state the titer of the toxin used. Birkhaug (11) found that blood serum drawn from the scarlet fever patients on the eighth day of the disease was capable of producing the Schultz-Charlton rash extinction phenomenon. Trask (14) is of the opinion that "the amount of scarlet fever toxin found in the blood of scarlet fever patients during the acute stage of the disease varies between very wide limits." He regards a possible range from one-fourth to 330 skin-test doses of toxin per cubic centimeter, though he recognized the possibility of a large error in his method of measuring the toxin. Therefore, he concludes that, "because of the difficulty of estimating the actual degree of toxemia by clinical observation, a generous excess

of antitoxin should be used in the treatment of scarlet fever if the best results are to be obtained." Blake and Trask (10) believe that "the duration of the specific toxemia of scarlet fever parallels the duration of the rash" and is dependent largely on the presence and severity of septic complications. Birkhaug (11) also reports that he obtained the blanching phenomenon in 100 per cent of his cases during the first 60 hours of the rash, but that the response was less satisfactory in cases of longer duration.

In 1925 Dick and Dick (7) employed as the therapeutic dose that amount of antitoxin necessary to neutralize 20,000 skin-test doses of toxin, which, in terms of standard units, equals 400 units of antitoxin per dose. Blake and Trask (15) concluded that the full amount of the antitoxin should be given promptly following the diagnosis. The dose recommended by them when injected intramuscularly varied from 3,000 to 12,000 units. Eley (16) injected as much as 10,000 units intravenously. The commercial package now supplied to the trade contains 6,000 units as a therapeutic dose.

Perhaps equally as important as the size of the dose is the route of injection. The onset of general symptoms, the appearance of the rash, and the rise in the temperature all occur within the space of a few hours; in our cases the rash, on an average, appeared on the second day. These facts undoubtedly mean that toxin is elaborated promptly and in large quantity.

It is well known that scarlet fever toxin when injected intradermally produces a visible reaction in as short a time as six hours (the Dick test). It has also been observed that, in the routine preparation of scarlet-fever toxin in the usual liquid media, practically the entire growth and toxin production occur within the first 24 hours.

Birkhaug and Howard (17) studied the pathologic changes in rabbits by the intravenous injection of scarlet fever toxin prepared from the Dochez N. Y. 5 strain. They found that when death occurred it came in less than 18 hours. One of us (unpublished data) studied the lethal effect of scarlet fever toxin prepared from the same strain. Altogether 96 rabbits were injected intravenously with doses varying from 25,000 to 150,000 skin-test doses. Fifty-six of these rabbits appeared acutely ill within a few hours and all were dead within an average of 16 hours. Nine rabbits similarly injected recovered from their early, acute symptoms but sickened again later and died within an average of 123 hours. Thirty-one rabbits developed the acute symptoms to a lesser degree and finally recovered. The most pronounced gross pathologic changes observed were the vascular disturbances, particularly in the thymus.

These observations, when viewed together, at least suggest that in a human case of scarlet fever the toxin appears early in the course of the disease, very quickly reaches its maximum, and exerts its

toxic action without delay. If these assumptions are correct, it becomes imperative that the patient receive the antitoxin very early in the disease and by a route which will distribute the antitoxin to all parts of the body within the shortest possible time. It indicates the need for intravenous rather than intramuscular therapy.

Eley (16) obtained his best results in those cases which received intravenous medication, some of which were given as high as 10,000 units. Banks and MacKenzie (18) treated 404 cases, admitted from May to December, 1928, by the intravenous route. The dose administered usually was 20 c. c. for adults and 10 c. c. for children of a serum of unstated titer. A parallel control group was not observed. No cases of otitis media, nephritis, or arthritis developed in the 404 intravenously treated cases. Sixty-seven cases of apparently the same severity were admitted late in 1927 or early 1928 and were given antitoxin by intramuscular injection, and of these 10.4 per cent developed otitis media, nephritis, or arthritis. During the year 1927, 285 scarlet fever patients were admitted who received no antitoxin, and in this group 11.9 per cent developed otitis, nephritis, or arthritis. They considered patients as unsuitable for intravenous treatment who were particularly subject to bronchitis, asthma, or other acute respiratory diseases, and those who were serum-sensitive. In fully 60 per cent of those treated, an immediate serum reaction developed which apparently was of a rather severe nature, but which passed off in about one-half hour. Only 2.8 per cent developed the usual serum sickness.

Banks (19) used intravenous antitoxin in the treatment of a severe outbreak of scarlet fever in a boys' school in February, 1929. The first nine cases to develop were treated without antitoxin, and in these there developed two cases of suppurative otitis media, two of non-suppurative otitis media, seven of albuminuria or nephritis, one case of antrum disease, one of dacryocystitis, one of pneumonia, one of jaundice, and six cases of nasal discharge. Sixteen cases subsequently developed which apparently were of the same severe type as the first nine. These received intravenous antitoxin within the first four days of the disease, and the only complications were one case of adenitis and one of hordeolum. One exception occurred in a boy, not included in the above groups, who was not given antitoxin until the seventh day, which was subsequent to the onset of several severe complications. Other serious complications developed in this boy following the administration of the antitoxin.

The results obtained by these clinicians with the intravenous method of administering antitoxin, considered with the evidence we have presented in the foregoing section on the action of the toxin, suggest rather definitely that, in order to be effective, the dose of

antitoxin, in addition to being ample promptly to neutralize all the free toxin present and provide a reserve for the neutralization of any additional toxin wh ch may be elaborated, must be administered by a route which will provide quick distribution throughout the body.

DISCUSSION

We have attempted to present in this report a detailed anlaysis of each case included within our study, the purpose being not only to note the more obvious clinical variations in our three groups but also to analyze the records more minutely with a view to determining wherein, if at all, scarlet fever streptococcus antitoxin fails to accomplish its purpose.

That the antitoxin has a specific neutralizing effect on the toxin *in vivo* is indicated by the decrease in the duration of the rash, by a change in the character and extent of the desquamation, and by a reduction in the number of complications. That it failed to neutralize completely the damaging effect of the toxic substances produced by the scarlet fever infection is suggested by the failure of the rash to disappear promptly, by the continuation of the fever, and by the appearance of complications in a certain number of serum-treated cases.

These failures may have been caused by (*a*), too small a therapeutic dose, (*b*) an improper method of administration, (*c*) administration too late in the disease, or (*d*) an inadequacy of antitoxin to neutralize all of the toxic substances elaborated in this disease. It is our belief, and this is confirmed by other clinicians and by investigations of the action of scarlet fever toxin, that early administration of antitoxin and its rapid dissemination throughout the body of the patient are essential; the toxin being elaborated very early in the disease and effecting its tissue damage without delay.

The probability of serum sickness must also be weighed in the use of scarlet fever antitoxin. However, the frequency of this complication can not be attributed entirely to a peculiar property of an antistreptococcic serum itself, since it was shown that previous sensitization to horse serum played an important rôle in its incidence. With the introduction of a more effective method of producing active immunity against diphtheria by the use of toxoid instead of toxin-antitoxin mixture, there will be a corresponding reduction in the percentage of children sensitized to horse serum. There is also the fervent hope that ultimately an improved method of manufacture will become available so that the volume of the therapeutic dose of scarlet fever streptococcus antitoxin may be greatly reduced, which in itself will minimize the probability of serum sickness.

BIBLIOGRAPHY

(1) Mamorek, A.: (1895) Le streptocoque et le serum antistreptococcique. Ann. de l'Inst. Pasteur, vol. 9, pp. 592–620.

(2) Moser, P.: (1902) Über die Behandlung des Scharlachs mit einer Scharlachstreptokkenserum. Wien. Klin. Wchnschr., vol. 15, pp. 1053–1055.

(3) Jochmann, G.: (1905) Die Bakterienbefunde bei Scharlach und ihre Bedeutung für den Krankheitsprocess. Ztschr. f. klin. Med., vol. 56, pp. 316–368.

(4) Dochez, A. R., and Sherman, L.: (1924) The significance of streptococcus hemolyticus in scarlet fever and the preparation of a specific anti-scarlatinal serum by immunization of the horse to streptococcus hemolyticus-scarlatinae. J. A. M. A., vol. 82, pp. 542–544 (Feb. 16).

(5) Dick, G. F., and Dick. G. H.: (1924) A scarlet fever antitoxin. J. A. M. A., vol. 82, pp. 1246–1247 (April 19).

(6) Blake, F. G., Trask, J. D., and Lynch. J. F.: (1924) Observations on the treatment of scarlet fever with scarlatinal antistreptococcic serum. J. A. M. A., vol. 82, pp. 712–714 (March 1).

(7) Dick, G. F., and Dick, G. H.: (1925) Therapeutic results with concentrated scarlet-fever antitoxin. Preliminary report: preparation, standardization, and dosage of the antitoxin. J. A. M. A., vol. 84, pp. 803–805 (March 14).

(8) Gatewood, W. E., and Baldridge, C. W.: (1927) Tissue hypersensitiveness following the administration of toxin-antitoxin. J. A. M. A., vol. 88, pp. 1068–1071 (April 2).

(9) Blake, F. G.: (1924) The treatment of scarlet fever with Dochez's antiscarlatinal serum. Boston Med. and Surg. J., vol. 191, pp. 43–47.

(10) Blake, F. G., and Trask, J. D.: (1926). Studies in scarlet fever: II. The relation of the specific toxemia of scarlet fever to the course of the disease. J. Clin. Invest., vol. 3, pp. 397–409 (December 20).

(11) Birkhaug, K. E.: (1925) Studies in scarlet fever. I. Studies concerning the blanching phenomenon in scarlet fever. J. Clin. Invest., vol. 1, pp. 273–294 (February 20).

(12) Gordon, J. E., and Creswell, S. M.: (1924) To what extent do toxin-antitoxin mixtures sensitize to therapeutic serum? J. Prevent. Med., vol. 3, pp. 21–30 (January).

(13) Dick, G. F., and Dick, G. H.: (1924) Scarlet fever toxin in preventive immunization. J. A. M. A., vol. 82, pp. 544–545 (February 16).

(14) Trask, J. D.: (1926) Studies in scarlet fever. I. The amount of scarlatinal toxin in the blood of patients with scarlet fever. J. Clin. Invest., vol. 3, pp. 391–396 (December 20).

(15) Blake, F. G., and Trask, J. D.: (1925) The treatment of scarlet fever with antitoxin. Boston Med. and Surg. Jour., vol. 193, pp. 659–665 (October 8).

(16) Eley, R. C.: (1928) Scarlet-fever antitoxin—Report of four hundred and sixty-five cases. Am. J. Dis. Child., vol. 35, pp. 14–17 (January).

(17) Birkhaug, K. E., and Howard, R. P.: (1930) Pathological lesions produced in rabbits following intravenous injection of concentrated scarlet fever toxin. Proc. Soc., Exp. Biol. and Med., vol. 28, pp. 95–100 (November).

(18) Banks, H. S., and MacKenzie, J. C. H.: (1929) Intravenous antitoxin in scarlet fever. Lancet, vol. 216, pp. 381–384 (February 23).

(19) Banks, H. S.: (1929) Intravenous antitoxin in an outbreak of scarlet ever in a public school. Brit. Med. J., vol. 2, p. 50 (July 13).

WHOLE-TIME COUNTY HEALTH OFFICERS, 1931

The following directory has been compiled from data furnished as of January 1, 1931, by State health officers. Similar directories for the years 1922 to 1930, inclusive, have been published in the PUBLIC HEALTH REPORTS. The directory for 1930 was issued as Reprint No. 1436.

In the questionnaire sent for the purpose of obtaining the necessary information, a "whole-time" county health officer was defined as "one who does not engage in the practice of medicine or in any other business, but devotes all his time to official duties."

Directories of State health departments have been published annually by the Public Health Service for the years 1912 to 1931, inclusive. The directory for 1930 was issued as Reprint No. 1425 from the PUBLIC HEALTH REPORTS.

Directories of city health officers have been published annually for the years 1916 to 1931, inclusive, the directory for 1930 being Reprint No. 1426.

Directories of State and city health officers for 1931 have been published in PUBLIC HEALTH REPORTS of December 4, 1931 (Reprints Nos. 1531 and 1532, respectively).

State and county	Name of health officer	Post-office address	Official title
Alabama:			
Baldwin	J. Chason, M. D	Bay Minette	County health officer.
Barbour	E. M. Moore, M. D	Clayton	Do.
Blount	C. V. Hendrix, M. D	Oneonta	Do.
Bullock	A. M. Shelamer, M. D	Union Springs	Do.
Calhoun	G. A. Cryer, M. D	Anniston	Do.
Chambers	D. D. Carr, M. D	Lafayette	Do.
Cherokee	S. C. Tatum, M. D	Center	Do.
Choctaw	W. G. Carnathan, M. D	Butler	Do.
Clarke	R. D. Neal, M. D	Grove Hill	Do.
Cleburne	F. R. Wood, M. D	Heflin	Do.
Coffee	W. A. Stanley, M. D	Enterprise	Do.
Colbert	W. T. Burkett, M. D	Tuscumbia	Do.
Conecuh	E. L. Kelly, M. D	Evergreen	Do.
Covington	B. B. Matthews, M. D	Andalusia	Do.
Crenshaw	J. O. Foster, M. D	Luverne	Do.
Cullman	A. C. Bradham, M. D	Cullman	Do.
Dale	W. L. Orr, M. D	Ozark	Do.
Dallas	L. T. Lee, M. D	Selma	Do.
De Kalb	Lee Weathington, M. D	Fort Payne	Do.
Elmore	W. S. Owsley, M. D	Wetumpka	Do.
Escambia	George T. Rowe, M. D	Brewton	Do.
Etowah	C. L. Murphree, M. D	Gadsden	Do.
Franklin	J. E. McClellan, M. D	Russellville	Do.
Geneva	L. S. Nichols, M. D	Geneva	Do.
Houston	R. E. Neff, M. D	Dothan	Do.
Jackson	M. H. Lynch, M. D	Scottsboro	Do.
Jefferson	J. D. Dowling, M. D	Birmingham	Do.
Lamar	J. A. Jackson, M. D	Vernon	Do.
Lauderdale	W. D. Hubbard, M. D	Florence	Do.
Lawrence	R. E. Harper, M. D	Moulton	Do.
Lee	O. L. Chason, M. D	Opelika	Do.
Limestone	W. J. Donald, M. D	Athens	Do.
Lowndes	E. F. Leatherwood, M. D	Hayneville	Do.
Macon	E. S. Miller, M. D	Tuskegee	Do.
Madison	W. C. Hatchett, M. D	Huntsville	Do.
Marengo	E. T. Norman, M. D	Linden	Do.
Marion	L. L. Parks, M. D	Hamilton	Do.
Marshall	D. C. Jordan, M. D	Guntersville	Do.
Mobile	C. A. Mohr, M. D	Mobile	Do.
Monroe	T. E. Tucker, M. D	Monroeville	Do.
Montgomery	J. L. Bowman, M. D	Montgomery	Do.

State and county	Name of health officer	Post-office address	Official title
Alabama—Continued.			
Morgan	H. C. McRee, M. D	Decatur	County health officer.
Perry	J. R. Long, M. D	Marion	Do.
Pickens	J. L. Conyers, M. D	Carrollton	Do.
Pike	W. H. Abernethy, M. D	Troy	Do.
Shelby	J. M. Kimmey, M. D	Columbiana	Do.
Sumter	J. S. Hough, M. D	Livingston	Do.
Talladega	J. H. Hill, M. D	Talladega	Do.
Tallapoosa	C. O. Fargason, M. D	Dadeville	Do.
Tuscaloosa	A. A. Kirk, M. D	Tuscaloosa	Do.
Walker	A. M. Waldrop, M. D	Jasper	Do.
Washington	I. C. Sumner, M. D	Chatom	Do.
Wilcox	E. L. McIntosh, M. D	Camden	Do.
Winston	R. Lee Hill, M. D	Double Springs	Do.
Arizona:			
Cochise	R. B. Durfee	Bisbee	County health officer.
Coconino	G. F. Manning, M. D	Flagstaff	Do.
Gila	A. C. McKean, M. D	Globe	Director, county health unit.
Maricopa	G. H. Spivey, M. D	Phoenix	Do.
Pima	A. N. Crain, M. D	Tucson	Do
Yuma	Harry A. Reese, M. D	Yuma	City-county health officer.
Arkansas:			
Arkansas	A. B. Jemison, M. D	Stuttgart	Director, health unit.
Ashley	A. M. Gibbs, M. D	Hamburg	Do.
Clark	T. T. Ross, M. D	Arkadelphia	Do.
Conway	W. H Bruce, M. D	Morrilton	County health officer.
Cross	J. D. McKie, M. D	Wynne	Do.
Desha	J. C. Miller, M. D	McGehee	Do.
Drew	G. C. De Bolt, M. D	Monticello	Do.
Garland	J. F. Merritt, M. D	Hot Springs	County and city health officer.
Jackson	M. B. Owens, M. D	Newport	County health officer.
Little River	J. W. Ringgold, M. D	Ashdown	Do.
Lonoke-Jefferson [1]	Geo. A. Hays, M. D	Pine Bluff	Supervising director.
Mississippi	A. M. Washburn, M. D	Blytheville	County health officer.
Monroe	C. A. Henry, M. D	Clarendon	Do.
Ouachita	R. C. Kennerly, M. D	Camden	Do.
Phillips	W. R. Bruce, M. D	Helena	County and city health officer.
Pope	A. B. Tate, M. D	Russellville	County health officer.
Pulaski	C. McA. Wassell, M. D	Little Rock	Do.
Saline	T. C. Watson, M. D	Benton	Do.
Sebastian	J. E. Johnson, M. D	Fort Smith	County and city healt officer.
Union	Ernest W. Prothro, M. D	El Dorado	Director of health unit.
White	Orlie Parker, M. D	Searcy	County health officer.
Woodruff	J. F. Hays, M. D	McCrory	Do.
Yell	T. J. Pool, M. D	Ola	Do.
California:			
Contra Costa	Paul G. Capps, M. D	Martinez	Do.
Imperial	Warren F. Fox, M. D	El Centro	Do.
Los Angeles	J. L. Pomeroy, M. D	Los Angeles	Do.
Madera	H. B. Neagle, M. D	Madera	Do.
Monterey	Roy M. Fortier, M. D	Salinas	Do.
Orange	K. H. Sutherland, M. D	Santa Ana	Do.
Riverside	W. B. Wells, M. D	Riverside	Do.
San Diego	Alex. M. Lesem, M. D	San Diego	City and county health officer.
San Joaquin	J. J. Sippy, M. D	Stockton	District health officer.
San Luis Obispo	Allen F. Gillihan, M. D	San Luis Obispo	County health officer.
Santa Barbara	R. C. Main, M. D	Santa Barbara	Do.
Stanislaus	L. M. Coulter, M. D	Modesto	Director.
Yolo	F. R. Fairchild, M. D	Woodland	County health officer.
Colorado:			
Otero	Guy A. Ashbaugh, M. D	Rocky Ford	Health officer.
Connecticut:			
Fairfield	Lawrence E. Poole, M. D	Bridgeport	Do.
Delaware:			
Kent	C. A. Sargent, M. D	Dover	County unit officer.
New Castle	R. C. Strode, M. D	Newark	Do.
Sussex	E. F. Smith, M. D	Georgetown	Do.
Florida:			
Leon	L. J. Graves, M. D	Tallahassee	County health officer.
Manatee	J. W. Henagan, D. V. M	Manatee	Health officer.
Taylor	W. H. Y. Smith, M. D	Perry	County health officer.
Georgia:			
Baldwin	O. F. Moran, M. D	Milledgeville	Commissioner of health.
Bartow	A. C. Shamblin, M. D	Cartersville	Do.
Bibb	J. D. Applewhite, M. D	Macon	Do.
Brooks	R. E. McClure, M. D	Quitman	Do.
Chatham	V. H. Bassett, M. D	Savannah	Do.
Clarke	T. H. Johnston, M. D	Athens	Do.

[1] Bi-county project.

State and county	Name of health officer	Post-office address	Official title
Georgia—Continued.			
Clinch	J. H. Sessions, M. D	Homerville	Commissioner of health.
Cobb	J. E. Lester, M. D	Marietta	Do.
Coffee	J. W. Wallace, M. D	Douglas	Do.
Colquitt	T. H. Chesnutt, M. D	Moultrie	Do.
Decatur	M. A. Fort, M. D	Bainbridge	Do.
De Kalb	J. R. Evans, M. D	Decatur	Do.
Dougherty	Hugo Robinson, M. D	Albany	Do.
Floyd	B. V. Elmore, M. D	Rome	Do.
Glynn	H. L. Akridge, M. D	Brunswick	Do.
Grady	J. R. Dykes, M. D	Cairo	Do.
Hall	C. J. Wellborn, M. D	Gainesville	Do.
Jefferson	L. R. Bryson, M. D	Louisville	Do.
Jenkins	Guy G. Lunsford, M. D	Millen	Do.
Laurens	O. H. Cheek, M. D	Dublin	Do.
Lowndes	G. T. Crozier, M. D	Valdosta	Do.
Mitchell	C. O. Rainey, M. D	Camilla	Do.
Richmond	E. E. Murphey, M. D	Augusta	Do.
Spalding	W. C. Humphries, M. D	Griffin	Do.
Sumter	R. A. Berry, M. D	Americus	Do.
Thomas	H. B. Jenkins, M. D	Thomasville	Do.
Troup	S. C. Rutland, M. D	Lagrange	Do.
Walker	J. H. Hammond, M. D	La Fayette	Do.
Ware	Geo. E. Atwood, M. D	Waycross	Do.
Washington	O. L. Rogers, M. D	Sandersville	Do.
Idaho:			
Twin Falls	George C. Halley, M. D	Twin Falls	Director, Twin Falls County health unit.
Illinois:			
Du Page	William V. Hopf, D. D. S.	Wheaton	County superintendent public health.
Morgan	V. H. de Somoskeoy, M. D	Jacksonville	Health officer.
Iowa:			
Washington	C. W. Stewart, M. D	Washington	Medical director.
Woodbury	W. S. Petty, M. D	Sioux City	Do.
Kansas:			
Brown	R. B. Stafford, M. D	Hiawatha	Health officer.
Butler	R. J. Cabeen, M. D	Eldorado	County health officer.
Cherokee	C. R. Hopler, M. D	Columbus	Health officer.
Dickinson	C. H. Munger, M. D	Abilene	Do.
Geary	H. R. Ross, M. D	Junction City	County health officer.
Greenwood	J. G. Walker, M. D	Eureka	Health officer.
Lyon	J. S. Fulton, M. D	Emporia	Do.
Marion	J. H. Saylor, M. D	Marion	County health officer.
Ottawa	H. L. Hendricks, M. D	Minneapolis	Health officer.
Sedgwick	M. H. Hostetler, M. D	Wichita	Do.
Seward	W. G. Emery, M. D	Liberal	Do.
Shawnee	F. E. McCord, M. D	Topeka	Do.
Kentucky:			
Bell	M. D. Hoskins, M. D	Pineville	Do.
Boyd	R. D. Higgins, M. D	Ashland	Do.
Breathitt	Sam R. Page, M. D	Jackson	Do.
Bullitt	G. W. Kirk, M. D	Shepherdsville	Do.
Calloway	Jas. A. Outland, M. D	Murray	Do.
Carlisle	J. F. Harrell, M. D	Bardwell	Do.
Carter	E. H. Maggard, M. D	Grayson	Do.
Daviess	G. L. Thompson, M. D	Owensboro	Do.
Estill	S. T. Scrivner, M. D	Irvine	Do.
Fayette	R. E. May, M. D	Lexington	Do.
Floyd	Marvin Ransdell, M. D	Prestonsburg	Do.
Fulton	H. E. Prather, M. D	Hickman	Do.
Henderson	R. K. Galloway, M. D	Henderson	Do.
Hickman	Chas. Hunt, M. D	Clinton	Do.
Hopkins	C. R. Morton, M. D	Madisonville	Do.
Jefferson	E. P. Whistler, M. D	Louisville	Do.
Kenton	H. C. White, M. D	Covington	Do.
Knott	J. W. Duke, M. D	Hindman	Do.
Knox	John O. Salyers, M. D	Barbourville	Do.
Lawrence	M. H. Skaggs, M. D	Louisa	Do.
Lee	R. H. MacLeod, M. D	Beattyville	Do.
Leslie	H. C. Capps, M. D	Hyden	Do.
Letcher	R. D. Collins, M. D	Whitesburg	Do.
Lincoln	W. F. Lamb, M. D	Stanford	Do.
Madison	H. W. Sterling, M. D	Richmond	Do.
Magoffin	L. C. Coleman, M. D	Salyersville	Do.
Martin	Wm. N. Keith, M. D	Inez	Do.
Mason	J. H. Hutchings, M. D	Maysville	Do.
McLean	J. W. Scudder, M. D	Calhoun	Do.
Menifee	E. T. Riley, M. D	Frenchburg	Do.
Monroe	G. W. Bushong, M. D	Tompkinsville	Do.
Morgan-Elliott [1]	W. H. Wheeler, M. D	West Liberty	Do.
Muhlenberg	Roy M. Orsburn, M. D	Greenville	Do.

[1] Bi-county project.

State and county	Name of health officer	Post-office address	Official title
Kentucky—Continued.			
Ohio	A. D. Park, M. D.	Hartford	Health officer.
Owsley	Don E. Wilder, M. D.	Booneville	Do.
Perry	F. W. Caudill, M. D.	Hazard	Do.
Pike	F. W. Forge, M. D.	Pikeville	Do.
Scott	A. Stewart, M. D.	Georgetown	Do.
Trigg	G. M. Wells, M. D.	Cadiz	Do.
Union	J. F. Lynn, M. D.	Morganfield	Do.
Wayne	C. F. Holtegel, M. D.	Monticello	Do.
Webster	C. M. Smith, M. D.	Dixon	Do.
Louisiana:[2]			
Assumption	P. M. Payne, M. D.	Napoleonville	Director.
Avoyelles	T. B. Wilson, M. D.	Marksville	Parish health officer.
Caddo	W. J. Sandidge, M. D.	Shreveport	Do.
Caldwell	Thos. Burk, M. D.	Columbia	Director.
Catahoula	W. C. Coney, M. D.	Harrisonburg	Do.
Claiborne	H. R. Marlatt, M. D.	Homer	Parish health officer.
Concordia	John Schreiber, M. D.	Vidalia	Director.
De Soto	R. A. Tharp, M. D.	Mansfield	Parish health officer.
East Carroll	W. J. Barber, M. D.	Lake Providence	Director.
Franklin	R. E. Applewhite, M. D.	Winnsboro	Do.
Iberia	B. L. Stinson, M. D.	New Iberia	Parish health officer.
Iberville	J. C. Eby, M. D., Phar. D.	Plaquemine	Director.
Lafayette	R. S. Hernandez, M. D.	Lafayette	Parish health officer.
Lafourche	H. S. Smith, M. D.	Thibodaux	Do.
La Salle	H. H. Bishop, M. D.	Jena	Director.
Lincoln	R. H. Allen, M. D.	Ruston	Do.
Madison	E. S. Freeman, M. D.	Tallulah	Do.
Morehouse	N. P. Liles, M. D.	Bastrop	Do.
Natchitoches	W. W. Knipmeyer, M. D., C. P. H.	Natchitoches	Parish health officer.
Ouachita	John W. Williams, M. D., C. P. H.	Monroe	Do.
Pointe Coupee	F. F. Rougon, Ph. G., M. D.	New Roads	Do.
Rapides	Edmond Klamke, M. D., M. P. H.	Alexandria	Do.
Richland	R. O. C. Green, M. D.	Rayville	Director.
St. Landry	J. A. Coleman, M. D.	Opelousas	Do.
St. Martin	P. H. Fleming, M. D.	St. Martinville	Do.
St. Mary	L. R. Craig, M. D.	Franklin	Do.
Tensas			
Terrebonne	M. F. Houston, M. D.	Houma	Do.
Washington	F. A. Williams, M. D.	Franklinton	Do.
Webster	W. C. Summer, M. D.	Minden	Parish health officer.
West Carroll	W. L. Stone, M. D.	Oak Grove	Director.
Maine:			
Motbov Union [3]	H. L. Jackson, M. D.	Old Town	
Rumford [4]	Thomas S. Barr, M. D.	Rumford	
Sanford [4]	W. H. Kelly, M. D.	Sanford	
Vassalboro [4]	A. R. Daviau, M. D.	Vassalboro	
Maryland:			
Allegany	J. P. Franklin, M. D.	Cumberland	County health officer.
Anne Arundel	C. F. Moriarty, M. D.	Annapolis	Do.
Baltimore	J. S. Bowen, M. D.	Towson	Do.
Calvert	I. N. King, M. D.	Prince Frederick	Do.
Carroll	W. C. Stone, M. D.	Westminster	Do.
Cecil	C. A. Kane, M. D.	Elkton	Do.
Frederick	E. C. Kefauver, M. D.	Frederick	Do.
Harford	T. A. Callahan, M. D.	Bel Air	Do.
Kent	R. G. Beachley, M. D.	Chestertown	Do.
Montgomery	W. T. Pratt, M. D.	Rockville	Do.
Prince Georges	A. B. Hooton, M. D.	Upper Marlboro	Do.
Talbot	A. L. Ollar, M. D.	Easton	Do.
Washington	W. Ross Cameron, M. D.	Hagerstown	Do.
Wicomico	Seth H. Hurdle, M. D.	Salisbury	Do.
Massachusetts:			
Barnstable	A. P. Goff, M. D.	Hyannis	Do.
Michigan:			
Genesee	Leslie A. Lambert, M. D.	Flint	Commissioner.
Isabella	M. R. Kinde, M. D.	Mount Pleasant	County health officer.
Kent	J. D. Brook, M. D.	Grand Rapids	Do.
Midland	Arthur Newitt, M. D.	Midland	Do.
Oakland	J. D. Monroe, M. D.	Pontiac	Commissioner.
Ottawa	Ralph Ten Have, M. D.	Grand Haven	County health officer.
Saginaw		Saginaw	Do.
Wexford	S. C. Moore, M. D.	Cadillac	Commissioner.

[2] Parishes. [3] District. [4] Town.

State and county	Name of health officer	Post-office address	Official title
Michigan—Continued.			
District No. 1—Crawford. Kalkaska. Missaukee. Roscommon.	R. B. Howard, M. D	Grayling	Director.
District No. 2—Alcona. Iosco. Ogemaw. Oscoda.	F. T. Zieske, M. D	West Branch	Do.
District No. 3—Antrim. Charlevoix. Emmet. Otsego.	Carleton Dean, M. D	Charlevoix	Do.
District No. 4—Alpena. Cheboygan. Montmorency. Presque Isle.	Stanley Stealy, M. D	Rogers City	Do.
Minnesota.			
St. Louis	G. J. Ferreira, M. D	Duluth	County health officer.
Mississippi:			
Adams	Loren Wallin, M. D	Natchez	Director of health.
Bolivar	R. D. Dedwylder, M. D	Cleveland	Do.
Clarke	D. S. Johnson, M. D	Quitman	Do.
Coahoma	D. V. Galloway, M. D	Clarksdale	Do.
Copiah	A. L. Gray, M. D	Hazlehurst	Director.
Forrest	W. D. Beacham, M. D	Hattiesburg	Do.
Hancock	C. M. Shipp, M. D	Bay St. Louis	Do.
Harrison	Daniel J. Williams, M. D	Gulfport	Do.
Hinds	W. E. Noblin, M. D	Jackson	Do.
Holmes	C. J. Vaughn, M. D	Lexington	Do.
Humphreys	W. W. Scott, M. D	Belzoni	Do.
Jackson	R. G. Lander, M. D	Pascagoula	Do.
Lamar	J. N. Mason, M. D	Purvis	Do.
Lauderdale	J. T. Googe, M. D	Meridian	Do.
Lee	W. H. Cleveland, M. D	Tupelo	Do.
Leflore	C. P. Coogle, M. D	Greenwood	Do.
Lincoln	W. R. May, M. D	Brookhaven	Do.
Monroe	C. H. Love, M. D	Aberdeen	Do.
Pearl River	G. E. Godman, M. D	Poplarville	Do.
Perry	B. T. Robinson, M. D	New Augusta	Do.
Sharkey-Issaquena[1]	A. K. Barrier, M. D	Rolling Fork	Do.
Sunflower	J. H. Janney, M. D	Indianola	Do.
Tishomingo	J. W. Barkley, M. D	Iuka	Do.
Union	L. A. Barnett, M. D	New Albany	Do.
Warren	F. Michael Smith, M. D	Vicksburg	Do.
Washington	J. W. Shackelford, M. D	Greenville	Do.
Yazoo	Hugh L. McCalip, M. D	Yazoo City	Do.
Missouri:			
Boone	Finis Suggett, M. D	Columbia	Health officer.
Buchanan	W. S. Hull, M. D	St. Joseph	Do.
Dunklin	Wheeler David, M. D	Kennett	Do.
Greene	J. W. Williams, M. D	Springfield	Do.
Jackson	Joseph T. Brennan, M. D	Independence	Do.
Marion	E. M. Lucke, M. D	Hannibal	Do.
Miller	E. K. Musson, M. D	Eldon	Do.
New Madrid	Wm. N. O'Bannon, M. D	New Madrid	Do.
Nodaway	C. P. Fryer, M. D., C. P. H.	Maryville	Do.
Pemiscot	Fred L. Ogilvie, M. D	Caruthersville	Do.
St. Francois	W. W. Johnston, M. D	Flat River	Do.
St. Louis	Louis Obrock, M. D	Clayton	Do.
Scott	U. P. Haw, M. D	Benton	Do.
Montana:			
Cascade	F. L. Watkins, M. D	Great Falls	Do.
Gallatin	A. D. Brewer, M. D	Bozeman	Do.
Lewis and Clark	A. Jordan, M. D	Helena	Do.
Missoula	F. D. Pease, M. D	Missoula	Do.
New Mexico:			
Bernalillo	J. R. Scott, M. D	Albuquerque	County health officer.
Dona Ana	C. W. Gerber, M. D	Las Cruces	Do.
Eddy	O. E. Puckett, M. D	Carlsbad	Do.
Lea	M. A. Elstein, M. D	Lovington	Do.
McKinley	R. H. Wilson, M. D	Gallup	Do.
Santa Fe	E. B. Godfrey, M. D	Santa Fe	Do.
Union	H. M. Batson, M. D	Clayton	Do.
Valencia	P. H. McNellis, M. D	Los Lunas	Do.

[1] Bicounty project.

State and county	Name of health officer	Post-office address	Official title
New York:			
Cattaraugus	R. M. Atwater, M. D., Dr. P. H.	Olean	County health commissioner.
Cortland	Daniel R. Reilly, M. D	Cortland	Do.
Suffolk	Arthur T. Davis, M. D	Riverhead	Do.
Westchester	Matthias Nicoll, jr., M. D	White Plains	Do.
North Carolina:			
Beaufort	T. C. Britt, M. D	Washington	Health officer.
Bertie	S. O. Saunders, M. D	Windsor	Do.
Bladen	R. S. Cromartie, M. D	Elizabethtown	Do.
Buncombe	R. E. Fox, M. D	Asheville	Do.
Cabarrus	D. G. Caldwell, M. D	Concord	Do.
Cherokee	W. C. Morrow, M. D	Murphy	Do.
Columbus	Floyd Johnson, M. D	Whiteville	Do.
Craven	D. E. Ford, M. D	New Bern	Do.
Cumberland	L. L. Williams, M. D	Fayetteville	Do.
Davidson	G. C. Gambrell, M. D	Lexington	Do.
Durham	J. H. Epperson, Ph. D	Durham	Do.
Edgecomb	R. E. Broadway, M. D	Tarboro	Do.
Forsythe	J. R. Hege, M. D	Winston-Salem	Do.
Franklin	R. F. Yarborough, M. D	Louisburg	Do.
Gaston	R. E. Rhyne, M. D	Gastonia	Do.
Granville	J. A. Morris, M. D	Oxford	Do.
Guilford	R. M. Buie, M. D	Greensboro	Do.
Halifax	Z. P. Mitchell, M. D	Weldon	Do.
Henderson	J. H. Woodcock, M. D	Hendersonville	Do.
Johnston	C. C. Massey, M. D	Smithfield	Do.
Lenoir	Z. V. Moseley, M. D	Kinston	Do.
Mecklenburg	W. A. McPhaul, M. D	Charlotte	Do.
Moore	J. Symington, M. D	Carthage	Do.
Nash	G. F. Reeves, M. D	Nashville	Do.
New Hanover	J. H. Hamilton, M. D	Wilmington	Do.
Northampton	M. H. Seawell, M. D	Jackson	Do.
Pitt	R. S. McGeachy, M. D	Greenville	Do.
Randolph	G. H. Sumner, M. D	Asheboro	Do.
Richmond	C. N. Sisk, M. D	Rockingham	Do.
Robeson	E. R. Hardin, M. D	Lumberton	Do.
Rowan	C. W. Armstrong, M. D	Salisbury	Do.
Rutherford	J. C. Twitty, M. D	Rutherfordton	Do.
Sampson	John D. Kerr, M. D	Clinton	Do.
Surry	M. T. Foster, M. D	Mount Airy	Do.
Vance	F. R. Harris, M. D	Henderson	Do.
Wake	A. C. Bulla, M. D	Raleigh	Do.
Wayne	F. M. Register, M. D	Goldsboro	Do.
Wilkes	J. W. White, M. D	Wilkesboro	Do.
Wilson	L. J. Smith, M. D	Wilson	Do.
Ohio:			
Allen	J. J. Sutter, M. D	Lima	Health commissioner.
Ashtabula	W. S. Weiss, M. D	Jefferson	Do.
Belmont	F. R. Dew, M. D	St. Clairsville	Do.
Butler	C. J. Baldridge, M. D	Hamilton	Do.
Clinton	W. K. Ruble, M. D	Wilmington	Do.
Columbiana	T. T. Church, M. D	Lisbon	Do.
Coshocton	D. M. Criswell, M. D	Coshocton	Do.
Crawford	G. T. Wasson, M. D	Bucyrus	Do.
Cuyahoga	Robert Lockhart, M. D	Cleveland	Do.
Darke	W. D. Bishop, M. D	Greenville	Do.
Delaware	B. B. Barber, M. D	Delaware	Do.
Erie	F. M. Houghtaling, M. D	Sandusky	Do.
Fayette	J. F. Wilson, M. D	Washington C. H	Do.
Franklin	James A. Beer, M. D	Columbus	Do.
Hamilton	C. R. Campbell, M. D	Cincinnati	Do.
Hancock	S. F. Whisler, M. D	Findlay	Do.
Hocking	M. W. Bland, M. D	Logan	Do.
Huron	B. O. Pilkey, M. D	Norwalk	Do.
Jackson	J. W. Clark, M. D	Jackson	Do.
Jefferson	J. P. Young, M. D	Steubenville	Do.
Lorain	C. D. Barrett, M. D	Oberlin	Do.
Lucas	F. F. De Vore, M. D	Toledo	Do.
Mahoning	J. F. Elder, M. D	Youngstown	Do.
Marion	N. Sifritt, M. D	Marion	Do.
Meigs	Mrs. J. N. Gilliford, M. D.	Pomeroy	Do.
Mercer	F. E. Ayers, M. D	Celina	Do.
Miami	E. R. Hiatt, M. D	Troy	Do.
Montgomery	H. H. Pansing, M. D	Dayton	Do.
Morrow	R. L. Pierce, M. D	Mount Gilead	Do.
Muskingum	Beatrice Hagen, M. D	Zanesville	Do.
Perry	F. J. Crosbie, M. D	New Lexington	Do.
Pickaway			Do.
Preble	J. I. Nisbet, M. D	Eaton	Do.
Richland	T. R. Meyer, M. D	Mansfield	Do.
Ross	R. E. Bower, M. D	Chillicothe	Do.
Sandusky	O. H. Thomas, M. D	Fremont	Do.
Scioto	R. W. De Crow, M. D	Portsmouth	Do.
Seneca	J. J. Heaton, M. D	Tiffin	Do.

State and county	Name of health officer	Post-office address	Official title
Ohio—Continued			
Shelby	B. S. Stephenson, M. D.	Sidney	Health commissioner.
Stark	Floyd Stamp, M. D.	Canton	Do.
Summit	R. H. Markwith, M. D.	Akron	Do.
Trumbull	L. A. Connell, M. D.	Warren	Do.
Tuscarawas	J. Blickensderfer, M. D.	New Philadelphia	Do.
Washington	A. G. Sturgiss, M. D.	Marietta	Do.
Wayne	W. G. Rhoten, M. D.	Wooster	Do.
Wood	H. J. Powell, M. D.	Bowling Green	Do.
Oklahoma:			
Carter	John L. Dorough, M. D.	Ardmore	County superintendent of health.
Le Flore	W. F. Lunsford, M. D.	Poteau	Do.
McCurtain	R. D. Williams, M. D.	Idabel	Do.
Muskogee	G. S. Atkinson, M. D.	Muskogee	Do.
Okmulgee	Thomas M. Berry, M. D.	Okmulgee	Do.
Ottawa	F. P. Helm, M. D.	Miami	Do.
Pittsburg	Chas. M. Pearce, M. D.	McAlester	Do.
Pottawatomie	H. L. Wright, M. D.	Shawnee	Do.
Seminole	George Hunter, M. D.	Wewoka	Do.
Oregon:			
Clackamas	W. H. Miller, M. D.	Oregon City	County health officer.
Coos	Milton V. Walker, M. D.	Coquille	Do.
Douglas	B. R. Shoemaker, M. D.	Roseburg	Do.
Jackson	B. C. Wilson, M. D.	Medford	Do.
Klamath	G. S. Newsom, M. D.	Klamath Falls	Do.
Lane	S. M. Kerron, M. D.	Eugene	Do.
Marion	Vernon Douglas, M. D.	Salem	Do.
Multnomah	H. R. Cliff, M. D.	Portland	Do.
Pennsylvania:			
Allegheny	John R. Conover, M. D.	Pittsburgh	District director.
Bucks	Charles W. Many, M. D.	Doylestown	Do.
Luzerne	W. F. Davison, M. D.	Wilkes-Barre	Do.
South Carolina:			
Aiken	W. G. Bodie, M. D.	Aiken	Health officer.
Anderson	E. E. Epting, M. D.	Anderson	Do.
Beaufort	H. B. Senn, M. D.	Beaufort	Do.
Berkeley	W. K. Fishburne, M. D.	Moncks Corner	Do.
Charleston	Leon Banov, M. D.	Charleston	Do.
Cherokee	E. P. White, M. D.	Gaffney	Do.
Darlington	W. A. Carrigan, M. D.	Darlington	Do.
Dillon	G. E. McDaniel, M. D.	Dillon	Do.
Dorchester	A. R. Johnston, M. D.	St. George	Do.
Fairfield	J. L. Bryson, M. D.	Winnsboro	Do.
Florence	J. G. McMaster, M. D.	Florence	Do.
Georgetown	S. S. Simons, M. D.	Georgetown	Do.
Greenville	Baylis Earle, M. D.	Greenville	Do.
Greenwood	J. E. Brodie, M. D.	Greenwood	Do.
Horry	H. F. Wilson, M. D.	Conway	Do.
Kershaw	A. W. Humphries, M. D.	Camden	Do.
Lexington	M. B. Woodward, M. D.	Lexington	Do.
Marion	M. B. Montgomery, M. D.	Marion	Do.
Newberry	H. G. Callison, M. D.	Newberry	Do.
Oconee	T. G. Hall, M. D.	Walhalla	Do.
Orangeburg	G. C. Bolin, M. D.	Orangeburg	Do.
Richland	John B. Setzler, M. D.	Columbia	Do.
Spartanburg	J. Moss Beeler, M. D.	Spartanburg	Do.
South Dakota:			
Pennington	F. J. Austin, M. D.	Rapid City	Director Pennington County Health Department.
Tennessee:			
Blount	K. A. Bryant, M. D.	Maryville	Director.
Bradley	H. M. Roberson, M. D.	Cleveland	Do.
Carter	W. W. King, M. D.	Elizabethton	Do.
Davidson	J. J. Lentz, M. D.	Nashville	Health officer.
Dyer	J. E. Powers, M. D.	Dyersburg	Do.
Gibson	F. L. Roberts, M. D.	Trenton	Do.
Giles	A. F. Barr, M. D.	Pulaski	Director.
Greene	R. S. Cowles, M. D.	Greeneville	Health officer.
Hamilton	J. C. Eldridge, M. D.	Chattanooga	Director.
Hardeman	R. L. Cobb, M. D.	Bolivar	Do.
Humphreys	W. M. Dedman, M. D.	Waverly	Do.
Knox	A. G. Hufstedler, M. D.	Knoxville	Do.
Lake	J. P. Moon, M. D.	Tiptonville	Do.
Lauderdale	R. B. Griffin, M. D.	Ripley	Do.
Lewis	S. P. Simpson, M. D.	Hohenwald	Do.
Lincoln	D. D. Howser, M. D.	Fayetteville	Do.
Maury	H. C. Busby, M. D.	Columbia	Do.
Monroe	H. M. Kelso, M. D.	Madisonville	Do.
Montgomery	F. J. Malone, M. D.	Clarksville	Health officer.
Obion	J. W. Frost, M. D.	Union City	Do.
Roane	J. O. Fly, M. D.	Kingston	Do.
Rutherford	J. B. Black, M. D.	Murfreesboro	Do.
Sevier	C. P. Wilson, M. D.	Sevierville	Director.

State and county	Name of health officer	Post-office address	Official title
Tennessee—Continued			
Shelby	W. P. Moore, M. D.	Memphis	Health officer.
Sullivan	F. L. Moore, M. D.	Blountville	Do.
Sumner	G. M. Morris, M. D.	Gallatin	Director.
Tipton	A. J. Butler, M. D.	Covington	Do.
Unicoi	W. J. Abel, M. D.	Erwin	Do.
Washington	S. S. Moody, M. D.	Jonesboro	Do.
Weakley	M. D. Ingram, M. D.	Dresden	Do.
Williamson	W. C. Williams, M. D.	Franklin	Health officer.
Wilson	W. D. Cagle, M. D.	Lebanon	Director.
District No. 1 Fentress. Overton. Pickett.	E. W. Clark, M. D.	Livingston	Do.
District No. 2 Clay. Jackson.	F. B. Clark, M. D.	Gainesboro	Do.
District No. 3 Meigs. Rhea.	J. B. White, M. D.	Dayton	Do.
District No. 4 Bledsoe. Grundy. Sequatchie.	U. B. Bowden, M. D.	Pelham	Do.
Texas:			
Cameron	W. E. Spivey, M. D.	San Benito	Do.
Hidalgo	J. R. Mahone, M. D.	Edinburg	Do.
Jefferson	J. D. Blevins, M. D.	Beaumont	Do.
McLennan	W. F. Curran, M. D.	Waco	Do.
Nolan	M. H. Jensen, M. D.	Sweetwater	Do.
Potter	B. M. Primer, M. D.	Amarillo	Do.
Tarrant	T. C. Colley, M. D.	Fort Worth	Do.
Utah:			
Davis	Sumner Gleason, M. D.	Kaysville	Director Davis County health unit.
Utah	Palmer Romaine Bowdish, M. D.	Provo	Director Utah County health unit.
Virginia:			
Accomac-Northampton.[1]	C. J. Bradshaw, M. D.	Accomac	Health officer.
Albemarle	G. B. Young, M. D.	Charlottesville	Do.
Arlington	P. M. Chichester, M. D.	Clarendon	Do.
Augusta	H. M. Wallace, M. D.	Staunton	Do.
Brunswick-Greensville.[1]	T. H. Valentine, M. D.	Lawrenceville	Do.
Fairfax	R. E. Feagans, M. D.	Fairfax	Do.
Halifax	Kolbe Curtice	South Boston	Do.
Henrico	A. L. McLean, M. D.	Richmond	Do.
Nansemond-Isle of Wight.[1]	C. H. Dawson, M. D.	Suffolk	Do.
Norfolk-Princess Anne.[1]	J. Leake, M. D.	Portsmouth	Do.
Rockbridge	R. P. Cooke, M. D.	Lexington	Do.
Southampton	P. P. Causey, M. D.	Courtland	Do.
Wise	W. R. Culbertson, M. D.	Norton	Do.
Southside health district (9-county project). Amelia. Appomattox. Buckingham. Charlotte. Cumberland. Lunenburg. Nottoway. Powhatan. Prince Edward.	W. A. Brumfield, M. D.	Farmville	District health officer.
Washington:			
Chelan	Paul L. West, M. D.	Wenatchee	
Clarke	Geo. H. T. Sparling, M. D.	Vancouver	
King	C. L. Dixon, M. D.	Seattle	
Snohomish	H. L. Eldridge, M. D.	Everett	
Spokane	W. M. Newman, M. D.	Spokane	
Walla Walla	J. E. Vanderpool, M. D.	Walla Walla	
Whitman	R. J. Skaife, M. D.	Colfax	
Yakima	Lloyd Moffitt, M. D.	Yakima	
West Virginia:			
Berkeley	Edwin Cameron, M. D.	Martinsburg	County health officer.
Boone	A. M. Price, M. D.	Madison	Do.
Brooke	W. J. MacDonald, M. D.	Wellsburg	Do.
Fayette	H. H. Puckett, M. D.	Fayetteville	Do.
Gilmer	T. E. Cato, M. D.	Glenville	Do.
Hancock	J. E. Fisher, M. D.	New Cumberland	Do.

[1] Bicounty project.

State and county	Name of health officer	Post-office address	Official title
West Virginia—Con.			
Harrison	V. A. Selby, M. D., D. P. H.	Clarksburg	County health officer.
Kanawha	John Thames, M. D.	Charleston	Do.
Logan	V. A. Deason, M. D.	Logan	Do.
Marion	F. F. Sowers, M. D.	Fairmont	Do.
Marshall	W. G. C. Hill, M. D.	Moundsville	Do.
Monongalia	R. C. Farrier, M. D.	Morgantown	Do.
Ohio	W. H. McLain, M. D.	Wheeling	Do.
Preston	L. T. Browning, M. D.	Kingwood	Do.
Raleigh	A. F. Murphy, M. D.	Beckley	Do.
Wood	Arthur D. Knott, M. D., D. P. H.	Parkersburg	Do.

COMPARATIVE CURRENT STATE MORTALITY STATISTICS[1]

The present report on mortality from certain causes covers, for a majority of the States included, the months January to September, 1931. For some of the States the data for all of these months are not available. Similar reports have been previously published, covering periods of approximately 3 months and 6 months.[2] It is impossible to present data for all of the States on this basis of 3, 6, and 9 months, but each State is included in each report for as many months as possible with rates in each case for the "year to date" and comparative rates for the same period in preceding years. This arrangement makes it possible to compare the mortality of the current calendar year with the mortality of preceding years in the same State.

The rates are computed from current and generally preliminary reports furnished by State departments of health. Because of (*a*) some lack of uniformity in the method of classifying deaths according to cause, (*b*) some delayed death certificates, and (*c*) various other reasons, these preliminary rates can not be expected to agree in all instances with final rates published by the Bureau of the Census, which are based on a complete review and retabulation of the individual death certificates from each State. The preliminary rates given in the accompanying table are intended to serve only as a current index of mortality until final figures are issued by the Bureau of the Census.

Populations used in computing rates are estimates as of July 1 of each year, based on the 1920 and 1930 censuses.

[1] From the Office of Statistical Investigations, United States Public Health Service.
[2] Public Health Reports, Vol. 46 No. 27, page 1578 and No. 36, page 2120.

Death rates from certain causes in stated periods of 1931, with comparative data for corresponding periods in preceding years

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births: Infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality (143–150)	Rates per 100,000 population (annual basis): Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)	Tuberculosis, all forms (31–37)	Cancer, all forms (43–49)	Diabetes (57)	Diseases of the nervous system (70–86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87–96)	Diseases of the heart (87–90)	Diseases of the respiratory system (97–107)	Pneumonia, all forms (100–101)	Diseases of the digestive system (108–127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
16 States *	January to September	1931	11.2	63	30	6.4	2.6	3.4	2.3	3.3	2.7	29.5	1.3	1.0	2.5	64.6	96.9	20.2	117.0	91.3	214.7	214.0	95.2	83.8	72.2	12.9	85.6
		1930	11.4	63	30	6.3	3.0	3.9	1.9	4.6	4.0	19.6	1.0	1.0	3.7	68.2	96.9	19.7	118.2	90.9	228.1	210.5	94.8	82.4	73.9	17.0	91.8
Alabama	do	1931	10.6	67	41	7.8	6.1	8.0	1.0	3.4	4.4	45.2	.8	1.2	3.3	84.0	56.2	10.0	89.9	58.3	126.6	116.8	96.8	87.6	73.3	20.2	88.5
		1930	11.3	74	45	7.8	7.4	3.4	.8	10.4	3.4	34.4	.8	.7	1.5	82.3	50.8	8.1	93.9	60.1	144.0	127.1	97.6	86.8	88.2	30.5	98.3
		1929	12.4	78	47	8.9	7.5	2.8	1.0	10.3	5.7	143.9	1.0	1.1	1.0	82.9	46.6	8.5	96.8	58.3	136.8	127.4	98.7	91.4	101.3	28.5	89.8
		1928	12.0	81	50	8.5	8.9	10.2	.2	7.6	5.0	60.8	.8	(1)	(1)	89.3	47.6	9.7	(1)	57.1	(1)	127.4	(1)	103.9	(1)	37.1	87.7
		1927	10.1	63	34	7.4	11.9	4.6	.7	15.3	5.7	26.6	.7	(1)	(1)	86.7	47.2	7.6	(1)	47.0	(1)	97.9	(1)	60.4	(1)	29.8	73.4
Arizona	January	1931	16.6	152	131	13.5	2.6	15.8	(2)	5.3	10.5	84.1	(2)	2.6	18.4	346.9	39.4	7.9	113.0	57.8	165.6	128.8	349.5	247.0	81.5	15.8	63.1
		1930	16.3	136	97	4.2	8.1	(2)	2.7	8.1	10.7	43.0	(2)	2.7	56.4	351.9	51.0	13.4	145.1	61.8	163.9	150.4	314.3	263.3	86.0	37.6	37.6
		1929	14.7	119	78	3.2	13.7	(1)	(1)	5.5	(2)	11.0	(2)	2.7	11.0	316.1	41.2	(2)	79.7	46.7	142.9	131.9	112.7	74.2	236.4	151.2	44.0
California	January to June	1931	11.7	60	29	6.3	1.5	3.3	1.3	2.7	2.7	19.2	.7	.8	3.1	96.2	124.5	19.8	110.0	78.9	290.9	256.1	89.8	76.1	74.7	10.3	85.6
		1930	11.9	60	29	5.9	1.4	8.6	1.8	3.8	3.6	10.5	1.4	1.1	3.9	108.0	122.2	20.3	114.8	83.3	291.4	248.2	95.1	80.9	78.4	15.1	84.6
		1929	12.6	68	36	5.3	1.5	.8	2.5	6.4	3.0	30.8	.8	1.5	9.8	116.2	117.0	19.4	119.0	83.4	304.1	267.8	109.0	95.0	76.4	10.9	96.1
		1928	12.3	63	34	5.7	1.7	.8	1.0	5.8	6.1	16.8	1.8	1.1	1.9	120.2	119.7	19.2	120.4	84.9	276.8	239.4	99.2	87.6	79.1	13.9	99.9
Connecticut	January to September	1931	10.3	59	(1)	(1)	.8	2.7	.8	2.7	.8	20.6	6.3	1.8	.8	53.4	109.9	22.2	(1)	(1)	(1)	197.1	(1)	76.3	(1)	7.2	84.3
		1930	10.5	59	(1)	(1)	.7	.1	2.0	1.9	2.4	15.8	1.4	1.0	1.2	61.8	115.7	17.9	(1)	(1)	(1)	186.0	(1)	94.3	(1)	9.2	71.7
		1929	11.5	69	(1)	(1)	.8	4.0	1.2	2.9	3.5	47.1	.3	1.4	1.0	66.3	114.4	17.2	(1)	(1)	(1)	195.7	(1)	113.7	(1)	14.1	71.6
		1928	11.4	64	(1)	(1)	.9	4.8	1.8	7.3	5.2	23.7	.8	1.4	1.0	71.4	107.4	(1)	(1)	(1)	(1)	175.7	(1)	111.4	(1)	7.2	(1)
		1927	10.7	61	(1)	(1)	1.0	1.8	1.3	2.5	5.3	20.9	.8	(1)	.8	69.8	104.7	(1)	(1)	(1)	(1)	182.3	(1)	86.4	(1)	9.9	(1)
District of Columbia	do	1931	15.8	71	35	5.9	3.3	3.3	.5	4.1	5.2	21.7	.8	.5	6.8	121.0	133.7	25.2	158.4	108.2	359.3	295.3	170.0	147.3	110.6	17.1	145.1
		1930	15.1	70	38	9.8	3.8	.3	2.5	3.6	3.3	6.6	.8	.5	1.4	120.3	134.5	28.2	143.5	101.4	373.4	318.8	137.2	116.4	107.7	19.4	158.3
		1929	15.4	73	38	6.0	3.0	(2)	2.8	5.0	6.6	25.5	.8	.8	2.2	122.6	129.2	26.8	130.9	79.1	372.6	319.5	170.7	147.7	100.4	20.5	165.2
		1928	15.1	(1)	(1)	(1)	2.5	4.7	1.7	3.6	7.5	15.6	1.4	1.1	.8	125.3	126.7	29.0	146.3	102.7	347.8	308.5	161.9	135.7	99.9	15.6	158.6
		1927	15.0	(1)	(1)	(1)	2.3	(2)	.8	3.7	5.6	24.0	.8	2.0	.8	132.7	127.0	22.8	153.6	106.7	331.4	292.1	145.1	121.7	91.2	10.7	179.2

Florida	do	1931	11.9	64	31	10.4	6.7	3.1	.5	1.8	3.1	51.4	.3	.5	.7	70.5	68.1	14.2	124.9	104.8	201.2	185.5	69.6	56.6	88.1	11.7	114.5
		1930	12.2	65	32	9.7	5.3	5.5	.3	4.0	3.3	23.5	1.1	.5	.5	68.5	69.6	14.6	128.3	104.8	199.5	174.6	76.7	58.3	92.0	17.4	121.0
Georgia	January to July	1931	11.3	75	(1)	10.8	10.1	3.2	1.8	4.5	3.0	66.3	.7	.4	2.0	75.4	51.4	10.6	118.5	(1)	149.2	135.2	109.2	100.0	70.3	17.1	110.0
		1930	12.1	85	(1)	10.2	10.9	6.9	.9	10.3	2.6	43.4	1.1	.3	3.9	76.5	50.6	11.5	131.7	(1)	156.1	141.1	115.3	99.4	85.3	24.0	136.5
		1929	12.0	(1)	(1)	(1)	8.2	1.7	.8	8.2	3.3	132.4	(1)	(1)	(1)	77.8	45.6	9.8	(1)	(1)	(1)	123.0	(1)	88.8	(1)	18.5	132.5
Hawaii	January to September	1931	9.9	74	(1)	(1)	2.8	10.8	(2)	.3	5.9	11.9	1.0	(2)	2.8	99.8	52.7	12.9	(1)	56.2	(1)	108.2	(1)	100.9	115.2	50.3	74.7
		1930	10.4	81	(1)	(1)	2.9	5.4	.4	4.7	11.9	8.7	(2)	(2)	5.1	98.8	54.1	13.0	(1)	45.1	(1)	122.7	(1)	118.0	143.2	84.4	70.6
		1929	12.8	104	(1)	(1)	4.5	6.7	(2)	36.2	9.7	22.0	1.1	.7	26.9	102.7	64.2	12.7	(1)	54.9	(1)	119.9	(1)	156.1	179.6	112.4	(1)
		1928	11.8	(1)	(1)	(1)	7.7	2.3	1.5	2.7	13.8	21.8	(2)	(2)	4.2	125.9	62.4	6.5	(1)	57.0	(1)	113.7	(1)	155.5	146.6	83.4	(1)
Idaho	do	1931	9.8	59	26	2.9	2.4	2.4	2.1	7.8	1.8	10.8	.9	2.4	7.2	31.1	66.7	10.2	122.3	98.1	184.5	162.1	88.2	79.6	58.0	4.5	38.0
		1930	9.5	45	19	4.7	2.4	1.2	1.5	4.5	3.6	9.0	(2)	(2)	6.0	33.9	61.1	6.0	99.5	66.8	186.1	163.6	119.9	102.8	61.4	3.6	36.9
Illinois	January to July	1931	(1)	(1)	(1)	(1)	1.1	7.1	6.4	2.5	5.3	30.9	.5	.6	4.3	63.8	(1)	(1)	(1)	(1)	(1)	(1)	(1)	89.8	(1)	(1)	(1)
		1930	(1)	(1)	(1)	(1)	1.2	1.6	5.0	2.0	7.4	14.2	.2	.4	3.2	63.9	(1)	(1)	(1)	(1)	(1)	(1)	(1)	74.1	(1)	(1)	(1)
		1929	(1)	(1)	(1)	(1)	1.2	5.8	4.8	3.1	9.8	52.9	.1	1.0	4.0	77.2	(1)	(1)	(1)	(1)	(1)	(1)	(1)	100.0	(1)	(1)	(1)
		1928	(1)	(1)	(1)	(1)	1.2	1.4	2.2	4.1	7.9	(1)	(1)	(1)	3.2	77.9	(1)	(1)	(1)	(1)	(1)	(1)	(1)	116.8	(1)	(1)	(1)
		1927	(1)	(1)	(1)	(1)	1.5	6.7	2.9	4.5	8.0	(1)	(1)	(1)	1.8	81.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	86.9	(1)	(1)	(1)
Indiana	January to September	1931	11.6	60	28	6.4	2.4	5.8	3.7	4.1	2.9	39.6	.6	.9	5.9	59.1	103.2	16.0	(1)	107.3	(1)	170.0	(1)	87.9	(1)	11.9	74.8
		1930	11.8	58	27	6.1	3.7	2.0	2.2	3.6	3.6	19.8	.6	1.2	9.4	66.6	101.3	15.8	(1)	108.7	(1)	186.1	(1)	82.3	(1)	18.1	87.1
		1929	13.7	68	(1)	7.2	3.3	5.4	3.9	6.7	4.2	77.3	.2	.6	1.5	79.5	108.9	16.6	(1)	119.2	(1)	225.9	(1)	110.5	(1)	20.3	89.3
		1928	11.9	64	(1)	6.2	3.6	2.5	2.1	4.9	4.5	44.8	(1)	(1)	(1)	70.9	101.1	(1)	(1)	109.7	(1)	177.5	(1)	95.6	(1)	18.5	80.7
		1927	11.5	60	(1)	7.0	3.9	2.2	2.4	6.3	5.4	27.2	(1)	(1)	(1)	73.2	102.4	(1)	(1)	99.7	(1)	168.1	(1)	75.2	(1)	16.4	82.0
Iowa	do	1931	10.7	52	23	5.1	1.5	.2	2.1	2.6	1.3	30.4	.9	2.0	3.2	28.4	115.0	20.5	140.8	111.6	218.0	207.1	87.0	72.1	72.0	5.6	46.0
		1930	10.7	55	21	7.7	1.4	10.4	3.1	4.1	1.7	26.6	1.5	2.5	3.4	34.2	111.0	21.3	135.1	95.1	243.9	191.4	87.4	79.2	74.2	6.1	41.6
		1929	10.5	54	21	5.9	1.6	1.2	2.2	4.9	1.1	62.5	.8	1.2	1.8	35.4	109.0	18.1	132.4	96.8	249.5	217.6	76.9	62.8	63.1	4.1	51.1
		1928	10.2	57	22	5.5	2.3	(2)	1.8	3.2	2.1	41.2	.7	1.4	1.1	36.2	111.4	18.3	134.4	98.2	233.9	207.7	75.6	65.4	68.2	6.0	52.7
Kansas	do	1931	9.9	52	22	6.3	1.9	.6	1.3	1.3	1.8	34.8	.6	.6	1.3	38.2	94.5	22.4	120.9	94.9	188.2	147.7	62.2	54.2	74.4	8.0	96.6
		1930	10.4	53	23	7.6	2.2	5.5	2.6	4.1	3.1	31.5	2.9	.7	3.2	38.8	95.3	20.4	127.8	99.2	199.7	172.3	64.7	55.3	77.1	11.7	101.4
		1929	10.5	61	29	6.7	2.7	3.1	3.1	4.3	2.4	60.5	.5	.7	2.9	42.1	91.8	20.8	137.4	108.9	186.9	162.3	68.9	58.3	74.9	10.9	88.9
		1928	10.7	60	29	8.0	2.4	1.3	2.5	5.5	2.2	58.7	.4	1.0	1.0	41.0	95.9	20.1	139.2	106.4	197.7	171.5	69.7	56.8	88.1	18.0	90.2
Louisiana	January to August	1931	11.1	72	42	9.5	12.6	.8	.7	5.7	4.0	54.9	1.0	.6	2.8	86.5	66.3	14.0	78.1	54.3	201.4	183.8	101.8	91.1	92.3	22.2	110.4
		1930	11.9	86	53	10.4	10.8	6.6	.4	6.4	4.3	41.2	2.3	.7	4.4	90.1	66.6	13.3	92.8	62.3	215.7	198.7	103.5	95.5	91.2	24.9	112.5
		1929	11.8	80	58	11.1	9.9	3.2	.5	6.4	4.3	101.2	.6	.4	2.5	89.3	63.6	10.7	89.3	56.8	204.3	189.2	94.3	83.8	91.5	27.2	107.5
		1928	12.2	83	52	11.7	11.3	12.6	.3	9.7	4.9	64.4	.9	1.0	.8	96.8	63.0	12.2	95.4	64.7	190.7	178.6	112.2	100.7	95.1	28.0	112.2
Maryland	January to September	1931	13.4	77	43	6.3	4.4	7.8	2.0	6.6	2.3	25.2	.8	1.5	2.1	99.0	112.0	22.2	138.2	110.0	288.9	252.7	146.3	133.5	89.6	28.8	139.0
		1930	13.3	71	37	5.7	5.3	.5	2.3	5.2	2.5	11.3	.3	1.3	1.6	105.3	112.9	22.3	141.7	104.8	279.5	244.0	130.9	116.6	88.7	28.6	151.5
Michigan	do	1931	10.0	57	23	6.2	1.3	.7	2.7	4.0	3.0	20.2	2.1	.7	2.9	56.2	91.4	18.5	112.9	89.2	230.4	187.8	74.3	61.9	71.3	7.7	59.3
		1930	10.8	64	27	6.3	1.5	6.1	3.1	4.1	6.5	12.9	.6	.9	9.3	62.7	91.2	17.5	118.9	90.2	230.0	203.2	88.2	72.6	82.6	13.4	63.4
		1929	12.1	68	33	6.3	1.7	3.5	3.4	6.2	10.0	46.0	.9	1.2	20.9	70.3	92.9	20.5	134.1	93.7	249.7	218.1	110.9	95.1	88.0	16.3	67.6

*The States included are Alabama, District of Columbia, Florida, Idaho, Indiana, Iowa, Kansas, Maryland, Michigan, Minnesota, New Jersey, New York (exclusive of New York City), Ohio, Pennsylvania, Tennessee, Virginia.

(1) Not available.

(2) No deaths.

Death rates from certain causes in stated periods of 1931, with comparative data for corresponding periods in preceding years—Continued

State	Period	Year	Rate per 1,000 population, all causes	Rate per 1,000 live births: Infant mortality	Rate per 1,000 live births: All except malformations and early infancy	Rate per 1,000 live births: Maternal mortality (143–150)	Rates per 100,000 population (annual basis): Typhoid fever (1)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Poliomyelitis (22)	Lethargic encephalitis (23)	Meningococcus meningitis (24)
Minnesota	January to September	1931	9.9	48	18	4.0	0.3	0.4	0.9	2.5	1.1	25.7	2.0	1.2	1.8
		1930	9.7	44	15	5.2	1.0	4.3	1.6	2.8	1.4	15.6	1.4	1.5	2.1
		1929	10.0	50	19	4.1	1.0	3.6	2.6	5.1	2.3	46.6	.4	2.4	2.0
		1928	9.9	(1)	(1)	(1)	.6	.4	2.6	2.6	2.5	34.8	2.2	2.5	1.6
Mississippi	January to August	1931	10.3	(1)	(1)	(1)	7.5	.4	.4	2.9	3.8	50.7	.3	.1	2.1
		1930	11.4	(1)	(1)	(1)	9.0	1.9	.4	8.9	3.4	33.9	.5	.2	9.2
		1929	12.1	(1)	(1)	(1)	9.3	6.0	(1)	11.2	2.7	146.4	.8	.5	.6
Montana	January to September	1931	9.9	57	(1)	6.1	2.7	.2	2.2	10.7	1.7	37.5	2.0	1.0	2.5
		1930	9.7	(1)	(1)	(1)	3.0	3.0	3.0	3.0	.5	22.7	.5	1.5	5.5
Nebraska	January to July	1931	9.8	51	22	5.5	1.1	.1	2.2	5.5	2.5	28.8	1.0	.4	2.6
		1930	9.9	48	18	5.6	.9	10.5	3.2	3.5	3.2	20.1	.4	.7	3.1
		1929	10.4	59	30	6.6	1.5	2.9	5.9	14.0	3.5	69.6	.3	.9	3.1
New Jersey	January to September	1931	10.6	62	(1)	6.4	.9	3.2	2.5	3.2	3.4	15.6	3.8	.9	1.9
		1930	10.7	57	(1)	5.4	1.0	4.0	1.6	2.2	8.9	8.8	.3	1.0	1.9
		1929	11.6	62	(1)	5.5	1.1	1.0	1.1	5.4	10.3	30.1	.4	1.2	2.4
		1928	11.5	(1)	(1)	(1)	1.5	8.3	1.8	5.0	12.1	13.8	(1)	(1)	(1)
		1927	11.2	(1)	(1)	(1)	1.1	.7	3.0	5.0	9.2	12.3	(1)	(1)	(1)
New York[4]	do	1931	12.6	61	24	6.2	.9	1.8	2.7	3.0	1.6	15.8	2.6	1.1	1.0
		1930	12.6	60	24	5.7	1.3	1.8	1.4	4.2	2.7	10.7	1.9	.8	1.3
		1929	13.6	65	27	5.6	1.5	3.1	2.1	4.1	3.1	46.3	1.2	1.0	1.2
		1928	13.1	66	27	6.7	1.7	4.1	2.2	4.2	4.2	17.5	1.6	.9	.7
		1927	12.9	64	26	6.3	2.1	3.3	1.9	4.0	4.5	14.4	.7	.9	.2

State	Year	Tuberculosis, all forms (31–37)	Cancer, all forms (43–49)	Diabetes (67)	Diseases of the nervous system (70–86)	Cerebral hemorrhage, apoplexy (74)	Diseases of the circulatory system (87–96)	Diseases of the heart (87–90)	Diseases of the respiratory system (97–107)	Pneumonia, all forms (100–101)	Diseases of the digestive system (108–127)	Diarrhea and enteritis under 2 years (113)	Nephritis (128, 129)
Minnesota	1931	43.3	120.5	19.7	100.4	76.6	199.3	179.3	80.4	72.0	72.7	4.1	51.5
	1930	48.4	118.3	18.0	103.7	78.9	188.2	171.2	73.9	68.0	70.0	6.4	52.1
	1929	58.0	112.1	18.7	101.6	75.2	199.1	154.3	75.4	68.1	67.1	4.1	55.0
	1928	58.8	114.4	19.6	(1)	(1)	(1)	151.7	(1)	66.6	(1)	(1)	57.4
Mississippi	1931	77.2	49.5	7.4	(1)	73.3	(1)	100.4	(1)	65.7	(1)	15.0	87.8
	1930	85.1	47.0	8.9	(1)	70.2	(1)	106.9	(1)	68.3	(1)	13.9	101.9
	1929	77.5	44.1	6.5	(1)	64.0	(1)	99.2	(1)	64.1	(1)	21.4	92.4
Montana	1931	60.9	71.8	14.2	97.2	68.6	153.6	133.0	80.5	70.8	83.5	7.7	65.4
	1930	63.9	78.8	17.5	96.8	63.9	155.6	141.2	96.3	54.3	88.1	12.5	73.3
Nebraska	1931	26.5	96.4	22.8	115.2	91.4	195.0	167.1	73.4	65.0	70.8	6.0	70.3
	1930	27.4	106.7	23.4	117.7	91.1	201.5	177.5	85.8	74.6	73.3	5.2	58.8
	1929	33.7	96.7	23.4	119.3	89.9	200.6	179.2	83.4	72.9	73.1	5.1	57.7
New Jersey	1931	66.6	110.9	24.0	105.8	78.3	260.3	218.3	93.5	84.8	61.1	9.2	95.6
	1930	71.5	105.6	23.7	108.8	80.6	254.7	230.1	91.6	81.4	73.1	11.4	99.5
	1929	73.9	109.0	22.8	112.1	82.0	267.4	245.6	124.0	110.2	73.5	11.8	100.0
	1928	74.9	103.1	(1)	113.6	(1)	251.1	(1)	121.2	73.7	77.2	14.8	103.6
	1927	76.0	103.6	(1)	122.1	(1)	230.5	(1)	106.6	57.4	80.0	17.2	94.7
New York[4]	1931	64.8	132.0	26.5	128.5	102.3	351.6	362.2	92.0	79.0	71.9	9.6	114.8
	1930	69.3	126.2	28.1	134.6	103.2	337.0	293.5	99.6	85.1	76.7	10.6	118.5
	1929	75.2	124.9	26.6	149.4	114.1	366.1	319.3	126.0	109.8	73.3	10.8	112.7
	1928	77.7	123.4	25.1	152.3	117.1	349.8	300.3	112.3	93.6	76.9	12.6	110.5
	1927	80.9	124.5	24.8	148.9	111.7	331.0	285.3	105.5	88.2	78.3	13.3	115.2

North Carolina	do	1931	10.4	75	(1)	8.3	5.1	3.9	1.8	6.0	4.5	41.6	.5	.5	.7	72.2	(1)	(1)	(1)	(1)	(1)	(1)	(1)	93.9	(1)	23.3	(1)
		1930	11.5	79	(1)	7.7	4.2	.1	.9	10.3	5.0	26.8	.3	.6	.8	77.1	(1)	(1)	(1)	(1)	(1)	(1)	(1)	94.4	------	34.5	(1)
		1929	11.8	(1)	(1)	(1)	5.7	.7	1.4	9.3	6.7	95.2	.7	(1)	.6	84.1	(1)	(1)	(1)	(1)	(1)	(1)	(1)	89.5	(1)	32.5	(1)
		1928	11.4	(1)	(1)	(1)	5.5	21.8	1.2	7.0	6.2	33.9	.5	.6	(1)	81.3	(1)	(1)	(1)	(1)	(1)	(1)	(1)	94.8	(1)	42.9	(1)
Ohio	do	1931	11.1	60	27	6.6	2.1	2.6	3.4	2.2	2.0	34.3	.8	.9	1.7	64.6	97.9	21.0	131.2	108.4	253.2	218.5	92.5	82.4	63.4	10.3	74.7
		1930	11.5	57	24	5.6	2.7	3.6	2.2	3.3	2.6	20.5	1.3	1.0	2.0	66.0	106.6	21.6	118.4	107.4	256.3	226.3	85.9	75.1	65.6	16.0	79.6
		1929	12.6	(1)	(1)	(1)	1.9	4.6	2.2	9.5	2.9	74.3	.7	(1)	2.9	73.5	103.1	(1)	(1)	101.2	(1)	214.4	(1)	92.2	(1)	12.9	83.5
		1928	12.0	(1)	(1)	(1)	1.8	3.7	2.1	3.4	5.4	38.3	1.2	(1)	1.9	75.3	107.2	(1)	(1)	102.1	(1)	(1)	(1)	90.5	(1)	13.7	69.4
Pennsylvania	do	1931	11.4	67	35	6.1	1.5	5.2	2.5	2.7	3.1	32.7	.7	1.1	2.1	58.9	94.0	24.4	109.8	82.6	262.9	232.2	114.0	100.2	73.0	17.0	93.1
		1930	11.3	68	36	5.7	2.1	2.6	2.0	4.3	5.0	20.7	.5	1.0	2.3	61.4	95.4	21.4	112.0	82.7	253.1	229.2	108.6	95.0	81.3	21.2	101.7
		1929	12.4	72	39	6.3	2.0	4.6	2.7	6.4	6.7	67.7	.5	1.1	2.3	67.3	100.3	21.9	119.8	86.6	260.5	234.9	126.7	109.1	80.4	19.7	104.8
		1928	12.3	70	36	5.9	1.8	6.0	2.5	4.5	8.6	33.6	.8	1.2	1.0	72.6	99.4	22.3	(1)	90.2	(1)	230.4	(1)	114.7	(1)	22.6	111.0
South Carolina	January to August	1931	(1)	(1)	(1)	(1)	13.3	3.1	.5	5.8	2.6	87.5	1.5	1.1	2.8	70.2	47.6	9.7	(1)	(1)	277.6	(1)	(1)	112.4	(1)	(1)	122.5
		1930	(1)	(1)	(1)	(1)	16.7	.3	.3	13.5	4.5	43.3	1.0	2.8	4.7	78.9	38.5	8.3	(1)	(1)	316.3	(1)	(1)	106.2	(1)	(1)	119.0
		1929	(1)	(1)	(1)	(1)	14.2	.1	.6	14.2	5.4	104.2	.6	2.5	2.4	82.1	42.0	8.8	(1)	(1)	309.0	(1)	(1)	95.0	(1)	(1)	102.4
		1928	(1)	(1)	(1)	(1)	17.3	23.8	.3	12.1	4.6	51.7	1.0	2.9	1.7	88.8	44.2	8.3	(1)	(1)	303.6	(1)	(1)	118.7	(1)	(1)	108.2
		1927	(1)	(1)	(1)	(1)	21.5	3.5	.2	12.8	3.8	20.0	1.3	3.0	1.7	92.6	40.7	7.3	(1)	(1)	295.3	(1)	(1)	108.2	(1)	(1)	96.6
South Dakota	January to June	1931	8.4	60	28	4.6	1.4	(2)	.6	4.9	2.6	36.0	2.0	.6	.3	34.0	81.8	20.5	100.1	62.5	153.5	131.7	89.0	72.3	69.1	6.0	38.3
		1930	7.9	57	27	6.8	.9	5.2	1.2	3.5	2.0	27.4	.6	.3	(2)	42.0	68.5	19.2	82.8	53.0	135.2	112.2	75.5	62.9	52.5	7.3	46.9
		1929	9.1	69	37	6.3	1.8	3.5	4.1	5.0	1.5	87.8	2.1	.9	2.6	54.0	63.4	20.6	89.3	54.9	150.3	133.9	94.8	80.7	63.1	4.4	34.9
		1928	8.9	64	30	4.4	1.8	2.1	3.5	4.4	3.0	51.6	(1)	(1)	(1)	71.7	69.0	18.6	95.0	53.1	140.5	120.7	95.0	80.0	64.6	8.0	40.7
Tennessee	January to September	1931	10.7	71	46	7.7	9.3	5.1	2.1	5.4	4.0	44.4	.7	.4	4.9	109.9	55.1	10.1	95.6	59.5	127.1	112.3	99.5	88.5	86.3	23.3	65.9
		1930	11.3	69	41	8.4	11.2	6.2	1.3	6.4	3.6	33.8	1.0	.8	11.7	118.7	56.1	10.6	103.3	62.4	135.1	120.9	96.7	86.2	95.7	27.1	76.1
		1929	12.2	82	56	8.2	10.6	.5	1.9	7.8	4.5	128.9	1.1	.7	1.9	125.3	56.3	9.8	98.4	56.4	141.1	129.1	99.9	88.5	89.1	26.0	70.7
		1928	11.9	(1)	(1)	(1)	12.2	10.3	1.3	5.5	4.0	56.6	1.3	.8	.5	125.4	58.0	9.3	(1)	(1)	(1)	121.0	(1)	101.4	(1)	34.6	(1)
		1927	11.3	(1)	(1)	(1)	20.5	4.9	1.5	14.6	4.9	31.6	.9	.4	.5	131.2	(1)	(1)	(1)	(1)	(1)	(1)	(1)	76.4	(1)	29.3	(1)
Virginia	do	1931	12.0	75	(1)	7.7	6.9	4.2	1.3	5.9	3.7	58.0	.5	.5	2.0	90.0	61.9	15.3	128.5	100.3	214.3	192.9	96.6	86.3	73.8	23.2	104.1
		1930	11.8	72	(1)	6.5	5.6	4.9	1.1	12.5	3.7	30.1	.9	1.0	2.8	87.7	62.6	14.6	128.3	97.3	204.6	177.9	93.2	80.7	85.0	29.1	107.8
		1929	12.2	77	(1)	7.1	3.9	1.8	.7	11.6	4.9	115.1	1.2	1.2	1.5	93.6	63.7	11.1	126.5	89.3	194.1	175.9	83.3	71.9	74.7	21.8	101.7
West Virginia	do	1931	9.1	(1)	(1)	5.4	8.3	2.2	1.7	7.6	3.4	40.8	1.0	.5	.8	58.1	58.9	11.0	93.4	66.6	128.7	107.6	94.0	85.4	98.5	46.5	60.4
		1930	10.1	(1)	(1)	6.0	10.2	5.8	1.9	13.4	4.4	26.9	.4	.5	1.4	65.8	58.0	11.9	88.4	59.4	143.9	113.6	88.8	80.7	119.2	64.7	52.2
		1929	10.9	(1)	(1)	5.8	9.9	5.6	1.2	13.7	3.4	114.5	1.0	.6	.9	68.8	58.7	9.0	86.2	48.4	153.5	110.8	96.1	80.5	112.6	63.0	53.8
Wisconsin	do	1931	10.5	56	(1)	4.0	.7	1.8	2.4	2.2	1.7	21.8	1.7	1.8	1.5	50.6	115.3	(1)	(1)	(1)	(1)	(1)	(1)	70.7	(1)	10.2	(1)
		1930	10.3	56	(1)	4.9	.7	4.2	3.2	3.6	2.4	16.0	.8	1.0	2.4	52.0	111.2	(1)	(1)	(1)	(1)	(1)	(1)	71.3	(1)	9.7	(1)
		1929	10.9	64	(1)	(1)	1.3	3.0	2.6	4.1	2.4	51.9	.5	1.8	4.4	54.5	108.9	(1)	(1)	(1)	(1)	(1)	(1)	76.7	(1)	12.3	(1)
		1928	(1)	61	(1)	(1)	.7	.4	2.4	2.3	3.2	32.9	.6	1.7	3.1	59.5	(1)	(1)	(1)	(1)	(1)	(1)	(1)	82.9	(1)	11.8	(1)

[1] Not available. [2] No deaths [3] Exclusive of New York City.

COURT DECISION RELATING TO PUBLIC HEALTH

Liability of municipality for damage resulting from sewage disposal.—(Georgia Court of Appeals; City of Barnesville *v.* Parham, 160 S. E. 879; decided Oct. 3, 1931.) In an action brought against a city for damages caused by the emptying of sewage by the city into a stream which flowed through the plaintiff's land, the court of appeals in a syllabus opinion stated, in part, as follows:

A landowner may recover damages for the impaired rental value of his land and tenant houses thereon, resulting from a continuing nuisance caused by the emptying by a municipality of obnoxious and deleterious sewage into a stream which flows through the land, and also for damage to him while living in a dwelling house on the land, resulting from the contaminated atmosphere, poisonous gases, offensive odors and vapors caused by the contamination of the stream by the defendant. The measure of damages for the impaired rental value of the land is the difference between the rental value before the creation of the nuisance and the rental value afterwards. [Cases cited.]

DEATHS DURING WEEK ENDED NOVEMBER 28, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended November 28, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Nov. 28, 1931	Corresponding week, 1930
Policies in force	74, 138, 400	75, 166, 430
Number of death claims	11, 566	11, 701
Death claims per 1,000 policies in force, annual rate	8. 1	8. 1
Death claims per 1,000 policies, first 48 weeks of year, annual rate	9. 6	9. 5

Deaths [1] from all causes in certain large cities of the United States during the week ended November 28, 1931; infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon midyear population estimates derived from the 1930 census]

City	Week ended Nov. 28, 1931				Corresponding week, 1930		Death rate [2] for the first 48 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7, 167	10. 5	516	[4] 40	10. 7	652	11. 8	11. 9
Akron	83	6. 5	8	30	5. 9	5	7. 5	7. 8
Albany [5]	41	16. 6	1	20	11. 8	3	14. 0	14. 8
Atlanta [6]	90	16. 9	8	79	9. 0	2	15. 1	15. 3
White	54	15. 8	7	104	5. 5	1	11. 7	11. 4
Colored	36	20. 1	1	29	16. 1	1	21. 8	23. 0
Baltimore [5] [6]	173	11. 1	13	45	12. 1	19	14. 2	14. 0
White	127	9. 9	9	40	10. 9	14	12. 0	12. 7
Colored	46	16. 8	4	64	17. 8	5	20. 1	19. 8

See footnotes at end of table.

Deaths[1] from all causes in certain large cities of the United States during the week ended November 28, 1931; infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Nov. 28, 1931				Corresponding week, 1930		Death rate[2] for the first 48 weeks	
	Total deaths	Death rate[2]	Deaths under 1 year	Infant mortality rate[3]	Death rate[2]	Deaths under 1 year	1931	1930
Birmingham[6]	51	9.9	3	30	12.8	2	18.1	13.6
White	22	6.9	2	34	11.6	0	10.1	10.1
Colored	29	14.7	1	24	14.6	2	18.1	19.3
Boston	188	12.5	12	35	13.6	31	14.2	14.1
Bridgeport	32	11.3	4	67	6.7	1	11.0	10.8
Buffalo	125	11.2	9	41	11.5	14	12.9	12.9
Cambridge	29	13.3	6	124	11.5	1	12.1	11.8
Camden	37	16.2	6	104	14.9	3	14.1	13.5
Canton	15	7.3	1	25	6.4	1	10.0	9.9
Chicago[5]	582	8.8	34	31	9.9	50	10.5	10.4
Cincinnati	98	11.2	4	24	13.7	8	15.8	15.6
Cleveland	166	9.5	3	9	9.2	9	11.1	11.1
Columbus	78	13.8	2	19	13.8	7	18.5	15.4
Dallas[6]	50	9.5	9	--------	10.9	9	11.1	11.5
White	41	9.5	7	--------	10.3	7	9.8	10.5
Colored	9	9.9	2	--------	13.8	2	17.8	16.2
Dayton	35	7.9	3	43	8.1	2	10.5	9.5
Denver	79	14.1	6	60	13.9	10	13.8	14.9
Des Moines	26	9.4	1	19	7.3	4	11.0	11.6
Detroit	247	7.8	32	51	7.4	30	8.1	9.2
Duluth	21	10.8	1	27	7.7	2	11.2	11.4
El Paso	26	12.9	4	--------	11.1	3	15.2	17.0
Erie	19	8.4	1	21	9.9	1	10.2	11.2
Fall River[5][7]	22	10.0	2	47	11.8	2	11.1	11.6
Flint	20	6.4	0	0	4.6	1	6.9	9.1
Fort Worth[6]	23	7.2	1	--------	8.9	4	10.5	10.8
White	19	7.1	0	--------	9.1	4	10.1	10.3
Colored	4	7.7	1	--------	7.9	0	12.3	13.5
Grand Rapids	31	9.4	3	46	9.9	2	9.1	10.1
Houston[6]	60	10.1	4	--------	11.1	12	11.0	12.1
White	39	9.0	3	--------	10.6	6	10.2	10.7
Colored	21	13.2	1	--------	12.6	6	13.4	15.9
Indianapolis[6]	93	13.1	6	46	12.1	4	13.7	14.5
White	74	11.9	5	44	11.7	4	13.2	13.5
Colored	19	21.9	1	61	15.3	0	17.2	21.3
Jersey City	61	10.0	9	80	10.5	10	11.3	11.3
Kansas City, Kans.[6]	23	9.8	1	22	11.1	4	12.6	11.7
White	17	8.9	1	27	10.0	4	11.8	11.0
Colored	6	13.3	0	0	15.9	0	15.6	15.0
Kansas City, Mo.	77	9.8	6	48	10.3	2	12.9	13.2
Knoxville[6]	30	14.3	4	87	14.7	0	12.4	13.6
White	25	14.8	4	98	11.7	0	11.7	12.7
Colored	5	14.6	0	0	30.1	0	16.4	18.3
Long Beach	25	8.6	3	75	10.2	0	9.9	10.0
Los Angeles	267	10.6	15	44	11.1	21	10.6	11.0
Louisville[6]	65	11.0	3	27	9.8	5	13.8	13.5
White	46	9.2	0	0	9.4	5	12.4	12.0
Colored	19	20.8	3	215	12.1	0	21.5	21.5
Lowell[7]	23	12.0	2	52	10.4	2	12.7	13.4
Lynn	19	9.6	2	58	6.6	0	9.4	10.3
Memphis[6]	72	14.5	7	74	16.4	10	16.5	16.9
White	37	12.1	1	17	11.9	3	13.5	13.2
Colored	35	18.5	6	174	23.7	7	21.4	22.9
Miami[6]	16	7.4	0	0	10.8	1	11.7	10.9
White	11	6.6	0	0	9.1	0	10.8	9.6
Colored	5	10.3	0	0	16.6	1	14.8	15.3
Milwaukee	96	8.4	5	22	8.4	16	9.1	9.8
Minneapolis	76	8.4	4	26	9.7	5	11.0	10.7
Nashville[6]	47	15.8	3	45	15.2	8	16.8	16.5
White	31	14.3	2	40	15.0	7	14.4	14.0
Colored	16	19.5	1	63	15.8	1	22.9	23.1
New Bedford[7]	30	13.9	4	105	12.5	3	12.1	11.0
New Haven	30	9.6	2	30	10.3	2	12.4	12.7
New Orleans[6]	128	14.3	12	67	15.7	23	16.6	17.8
White	82	12.8	9	76	13.0	16	13.6	14.3
Colored	46	17.8	3	50	22.6	7	24.2	24.9

See footnotes at end of table.

Deaths [1] from all causes in certain large cities of the United States during the week ended November 28, 1931; infant mortality, annual death rate, and comparison with corresponding week of 1930—Continued

City	Week ended Nov. 28, 1931				Corresponding week, 1930		Death rate [2] for the first 48 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
New York	1,257	9.2	94	40	9.6	102	11.0	10.7
Bronx Borough	172	6.7	8	23	7.0	13	8.1	7.8
Brooklyn Borough	440	8.7	32	34	9.4	42	10.2	9.8
Manhattan Borough	469	13.5	38	51	14.0	40	16.6	15.9
Queens Borough	138	6.2	14	56	5.7	6	7.1	7.0
Richmond Borough	38	12.1	2	38	11.4	1	13.5	13.9
Newark, N. J.	84	9.8	7	37	9.8	9	11.4	12.0
Oakland	82	14.6	3	38	11.3	4	10.6	11.0
Oklahoma City	33	8.7	5	70	18.6	7	10.6	10.8
Omaha	43	10.3	4	46	12.6	3	13.7	13.6
Paterson	31	11.6	2	34	10.2	1	13.2	12.0
Peoria	26	12.5	2	53	15.3	7	12.5	12.3
Philadelphia	412	10.9	28	41	10.6	32	12.9	12.6
Pittsburgh	151	11.6	19	66	12.6	15	14.3	13.8
Portland, Oreg.	55	9.3	0	0	10.8	1	11.5	12.1
Providence	57	11.7	5	46	12.6	7	12.6	12.8
Richmond [6]	63	17.8	6	87	10.8	2	15.4	14.8
White	41	16.3	2	44	10.0	1	13.0	12.1
Colored	22	21.7	4	173	12.8	1	21.4	21.4
Rochester	70	11.0	4	37	9.2	3	11.8	11.6
St. Louis	229	14.4	20	72	11.3	14	14.9	14.0
St. Paul	52	9.8	4	41	9.8	3	10.4	10.1
Salt Lake City [5]	27	9.8	2	30	10.0	6	12.0	12.5
San Antonio	63	13.7	10		12.1	8	14.1	15.8
San Diego	41	13.7	1	21	18.1	3	13.5	14.4
San Francisco	139	11.2	1	7	13.9	3	12.9	13.0
Schenectady	24	13.0	0	0	10.3	2	10.8	11.1
Seattle	66	9.3	2	20	11.2	4	11.3	10.8
Somerville	17	8.4	1	31	7.5	2	8.8	9.6
South Bend	15	7.2	0	0	12.4	1	8.0	9.0
Spokane	35	15.7	1	26	9.9	2	12.4	12.4
Springfield, Mass.	31	10.6	1	17	12.5	2	11.5	12.1
Syracuse	49	12.0	2	25	11.7	7	11.5	11.6
Tacoma	36	17.4	1	28	12.7	3	12.2	12.5
Toledo	69	12.1	5	47	9.1	5	11.8	12.6
Trenton	26	10.9	1	18	10.6	3	16.2	16.4
Utica	24	12.2	1	28	8.7	2	14.3	14.7
Washington, D. C. [6]	136	14.4	9	50	16.2	11	15.9	15.2
White	78	11.4	7	58	14.1	4	13.6	13.1
Colored	58	22.4	2	34	21.9	7	22.0	20.9
Waterbury	12	6.2	0	0	8.9	5	9.6	9.4
Wilmington, Del. [7]	28	13.7	2	45	17.6	4	13.8	14.4
Worcester	47	12.4	5	72	10.4	5	12.0	12.7
Yonkers	32	12.0	1	24	11.5	7	8.4	8.2
Youngstown	30	9.0	3	41	9.5	3	9.9	10.4

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.
[4] Data for 77 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miama, 23; Nashville, 28; New Orleans, 29; Richmond, 29; and Washington, D. C., 27.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended December 5, 1931, and December 6, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 5, 1931, and December 6, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 5, 1931	Week ended Dec 6, 1930	Week ended Dec. 5, 1931	Week ended Dec 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930
New England States:								
Maine		3	1		180	23	0	0
New Hampshire		5			5	19	0	0
Vermont	1	2			42	1	0	0
Massachusetts	63	69	2	5	237	230	2	4
Rhode Island	2	7	2		236	2	0	1
Connecticut	6	18	12	1	38	80	0	4
Middle Atlantic States:								
New York	118	132	[1] 21	[1] 7	408	167	10	17
New Jersey	34	84	8	14	14	147	1	2
Pennsylvania	128	133			673	465	4	5
East North Central States:								
Ohio	131	51	7	4	26	73	8	3
Indiana	91	59	8	11	14	161	15	9
Illinois	167	160	6	21	39	129	9	7
Michigan	41	51		2	19	55	4	1
Wisconsin	23	12	8	25	42	148	0	2
West North Central States:								
Minnesota	44	18	1		16	12	2	0
Iowa	21	8			10	4	3	1
Missouri	84	43	2	3	20	492	0	1
North Dakota	1	12				3	0	0
South Dakota	16	10	1		6	1	0	0
Nebraska	36	17	6	3	8	3	0	2
Kansas	65	27		2	35	10	0	0

[1] New York City only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 5, 1931, and December 6, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930
South Atlantic States:								
Delaware	19	3			2	1	0	0
Maryland [2]	75	38	6	13	5	6	2	1
District of Columbia	21	15	1		2	8	0	2
Virginia								
West Virginia	43	30	29	43	213	9	1	1
North Carolina	140	107	56	10	42	20	2	4
South Carolina [3]	32	33	415	629	31		0	1
Georgia [3]	24	18	33	72	4	36	4	4
Florida	8	15		3		26	0	0
East South Central States:								
Kentucky	91						1	2
Tennessee	75	29	13	54	14	13	4	6
Alabama [3]	60	70	22	31	20	42	1	6
Mississippi	46	35					0	0
West South Central States:								
Arkansas	34	19	10	15	24	1	0	0
Louisiana	56	20	3	15	1	4	0	2
Oklahoma [4]	98	68	27	51		53	0	1
Texas [3]	216	121	42	52		44	1	1
Mountain States:								
Montana	6	1			126	3	0	0
Idaho	7					18	0	0
Wyoming	2						0	0
Colorado	7	9			6	23	0	2
New Mexico	9	18	1	2	5	26	1	2
Arizona	11	5	9	7	2	49	0	0
Utah [2]	1		5	6	1	2	2	8
Pacific States:								
Washington	22	32		18	87	17	4	8
Oregon	4	9	33	15	6	20	0	0
California	109	57	69	63	187	255	5	8

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930
New England States:								
Maine	1	1	43	19	0	0	3	18
New Hampshire	0	0	2	4	0	0	0	1
Vermont	0	0	5	7	10	1	0	1
Massachusetts	3	5	254	204	0	0	3	5
Rhode Island	0	0	17	18	0	0	0	0
Connecticut	2	1	52	57	30	0	2	8
Middle Atlantic States:								
New York	17	8	408	468	10	6	15	28
New Jersey	4	1	94	119	1	0	7	6
Pennsylvania	3	1	421	379	0	0	28	15
East North Central States:								
Ohio	4	16	456	473	14	46	27	31
Indiana	1	1	85	216	10	47	9	12
Illinois	20	9	283	304	12	43	36	19
Michigan	3	5	205	209	13	29	9	18
Wisconsin	3	4	87	83	4	8	4	5
West North Central States:								
Minnesota	13	7	64	61	4	15	1	1
Iowa	3	2	44	50	58	21	2	3
Missouri	0	2	71	90	7	9	11	5
North Dakota	0	1	13	17	3	5	1	4
South Dakota	0	5	13	7	15	17	1	0
Nebraska	0	5	42	44	3	63	1	2
Kansas	1	5	70	63	8	53	1	14

[2] Week ended Friday.

[3] Typhus fever, 1931, 11 cases: 3 cases in South Carolina, 3 cases in Georgia, 3 cases in Alabama, and 2 cases in Texas.

[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 5, 1931, and December 6, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 5, 1931	Week ended Dec 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930	Week ended Dec. 5, 1931	Week ended Dec. 6, 1930
South Atlantic States:								
Delaware	0	1	9	14	0	0	0	1
Maryland [2]	2	1	100	79	0	0	10	7
District of Columbia	0	0	16	20	0	0	0	0
Virginia	2	------	------	------	1	------	------	------
West Virginia	0	0	65	58	0	18	40	19
North Carolina	0	1	129	109	2	0	9	3
South Carolina [3]	0	0	11	20	0	3	7	11
Georgia [3]	0	1	32	56	0	0	2	8
Florida	0	0	8	12	0	0	11	2
East South Central States:								
Kentucky	0	2	75	71	3	0	29	20
Tennessee	2	0	41	58	5	3	16	11
Alabama [3]	1	0	52	82	1	0	18	5
Mississippi	0	1	26	22	17	10	10	16
West South Central States:								
Arkansas	0	0	25	16	0	8	10	25
Louisiana	0	0	23	18	4	3	20	15
Oklahoma [4]	0	0	25	65	1	23	25	32
Texas [3]	1	4	96	80	8	45	14	8
Mountain States:								
Montana	0	0	34	41	3	16	8	0
Idaho	0	0	2	6	3	0	0	0
Wyoming	0	0	11	1	1	0	1	0
Colorado	1	0	42	11	10	29	3	1
New Mexico	0	2	9	13	0	0	6	5
Arizona	1	0	8	2	0	0	0	1
Utah [2]	0	0	14	6	0	0	0	1
Pacific States:								
Washington	3	2	44	51	16	32	9	5
Oregon	0	2	13	8	15	30	1	3
California	5	12	127	99	16	36	6	12

[2] Week ended Friday.
[3] Typhus fever, 1931, 11 cases: 3 cases in South Carolina, 3 cases in Georgia, 3 cases in Alabama, and 2 cases in Texas.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October, 1931										
Florida	------	101	1	33	126	8	3	18	0	17
Mississippi	------	725	504	4,720	14	414	5	229	77	114
Wisconsin	10	86	52	2	51	------	130	221	7	17
November, 1931										
Arizona	5	73	12	7	5	1	1	26	2	9
Connecticut	1	17	22	------	99	------	35	167	0	12
Florida	------	89	4	27	35	2	2	24	2	12
Georgia	10	179	173	110	25	27	0	149	------	69
Tennessee	14	524	123	136	26	14	3	345	20	117

October, 1931	Cases
Chicken pox:	
Florida	3
Mississippi	153
Wisconsin	382
Dengue:	
Mississippi	2
Dysentery:	
Mississippi (amebic)	27
German measles:	
Wisconsin	9
Hookworm disease:	
Mississippi	154
Lethargic encephalitis:	
Wisconsin	3
Mumps:	
Florida	8
Mississippi	36
Wisconsin	352
Ophthalmia neonatorum:	
Mississippi	14
Wisconsin	1
Puerperal septicemia:	
Mississippi	28
Trachoma:	
Mississippi	2
Wisconsin	2
Tularaemia:	
Wisconsin	1
Typhus fever:	
Florida	2
Undulant fever:	
Wisconsin	1
Whooping cough:	
Florida	18
Mississippi	252
Wisconsin	559

November, 1931	Cases
Chicken pox:	
Arizona	99
Connecticut	206
Florida	12
Georgia	61
Tennessee	73
Dysentery:	
Connecticut (bacillary)	9
Florida	1
Georgia	12
Tennessee	5
Tennessee (amebic)	11
German measles:	
Connecticut	18
Tennessee	8
Hookworm disease:	
Tennessee	1
Impetigo contagiosa:	
Tennessee	2
Lead poisoning:	
Connecticut	1
Lethargic encephalitis:	
Connecticut	1
Tennessee	2
Milk sickness:	
Tennessee	6
Mumps:	
Arizona	10
Connecticut	118
Florida	13
Georgia	20
Tennessee	29
Ophthalmia neonatorum:	
Tennessee	2
Paratyphoid fever:	
Connecticut	6
Georgia	11
Rabies in animals:	
Connecticut	7
Septic sore throat:	
Connecticut	10
Georgia	34
Tennessee	24
Thrush:	
Tennessee	1
Trachoma:	
Arizona	14
Tennessee	3
Trichinosis:	
Connecticut	1
Tularaemia:	
Tennessee	1
Typhus fever:	
Connecticut	1
Georgia	19
Undulant fever:	
Arizona	2
Connecticut	8
Vincent's angina:	
Tennessee	4
Whooping cough:	
Arizona	14
Connecticut	148
Florida	5
Georgia	35
Tennessee	277

Cases of Certain Communicable Diseases Reported for the Month of September, 1931, by State Health Officers

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	11	13	36	17	18	0	50	18	35
New Hampshire		2			5	0		6	
Vermont	10	7	24	22	13	4	22	0	69
Massachusetts	63	146	80	121	358	0	498	30	546
Rhode Island	1	16	36	25	51	0	45	13	20
Connecticut	32	20	17	26	26	0	81	27	258
New York	163	227	233	233	463	1	1,711	210	1,562
New Jersey	33	57	43	31	137	0	306	66	880
Pennsylvania	167	297	289	284	456	0	639	282	1,541
Ohio	116	265	91	127	586	8	664	374	803
Indiana	21	56	28	22	112	31	205	66	120
Illinois	131	202	167	102	381	26	921	177	1,016
Michigan	85	73	59	110	285	9	453	97	848
Wisconsin	156	58	80	248	88	5	169	29	559
Minnesota	66	61	29		124	6	[1] 160	46	71
Iowa	17	33	9	19	50	17	35	14	92
Missouri	10	211	18	11	86	26	205	136	413
North Dakota	9	5	7	51	15	6	21	17	83
South Dakota	39	22	15	28	27	11	14	13	23
Nebraska	6	33	4	16	26	4	14	9	30
Kansas	35	46	28	57	99	4	49	41	51
Delaware	2		1	11		0	20		31
Maryland	34	103	24	16	119	0	210	158	510
District of Columbia	1	35	3		23	0	90	11	89
Virginia	29	360	94		210	5	162	253	415
West Virginia	20	122	39		94	2	35	281	96
North Carolina	47	453	31		297	0		202	363
South Carolina	15	171	24	21	46	2	85	211	52
Georgia	7	162	13	11	71	0	243	203	17
Florida		46			17	0		23	
Kentucky [2]									
Tennessee	17	273	13	11	150	10	196	293	79
Alabama	21	299	26	13	156	3	420	127	81
Mississippi	162	534	8	42	106	16	131	169	266
Arkansas	6	149	12	14	66	4		134	14
Louisiana	5	151	7	0	54	11	[1] 152	265	19
Oklahoma [3]	13	205	3	1	83	18	63	202	19
Texas		94			93			125	
Montana	31	11	43	1	33	3	42	28	40
Idaho	21	14	13	12	32	9	11	30	3
Wyoming	8	1	5	2	14	2	1	9	18
Colorado	23	26	11	29	47	1	50	29	57
New Mexico	2	15	4		8	0	42	29	24
Arizona	5	16	10	7	15	0	103	27	3
Utah [2]									
Nevada	2		1		4	0	[1] 2	6	
Washington	78	30	33	20	126	26	210	31	181
Oregon	30	8	25	29	24	17	28	34	30
California	212	230	299	209	327	18	937	117	583

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

Case Rates per 100,000 Population (Annual Basis) for the Month of September, 1931

State	Chicken pox	Diphtheria	Measles	Mumps	Scarlet fever	Smallpox	Tuberculosis	Typhoid and paratyphoid fever	Whooping cough
Maine	17	20	55	26	27	0	76	27	53
New Hampshire	-------	5	-------	-------	13	0	-------	16	-------
Vermont	34	24	81	74	44	14	74	0	233
Massachusetts	18	41	23	34	101	0	141	8	155
Rhode Island	2	28	63	44	89	0	78	23	35
Connecticut	24	15	13	10	19	0	60	20	192
New York	15	21	22	22	44	0	162	20	148
New Jersey	10	17	13	9	40	0	116	19	258
Pennsylvania	21	37	36	35	57	0	80	35	192
Ohio	21	48	16	23	106	1	120	67	145
Indiana	8	21	10	8	42	12	76	25	45
Illinois	21	32	26	16	60	4	144	28	159
Michigan	21	18	14	27	70	2	111	24	207
Wisconsin	64	24	33	101	36	2	69	12	229
Minnesota	31	29	14	-------	58	3	[1] 75	22	83
Iowa	8	16	4	9	25	8	17	7	45
Missouri	3	70	6	4	29	9	68	45	137
North Dakota	16	9	12	91	27	11	37	30	147
South Dakota	68	38	26	49	47	19	24	23	40
Nebraska	5	29	4	14	23	4	12	8	26
Kansas	22	30	18	37	64	3	31	26	33
Delaware	10	-------	5	56	-------	0	101	-------	157
Maryland	25	76	18	12	88	0	155	116	875
District of Columbia	2	86	7	-------	57	0	222	27	220
Virginia	14	180	47	-------	109	2	81	126	207
West Virginia	14	84	27	-------	65	1	24	194	66
North Carolina	18	170	12	-------	111	0	-------	76	136
South Carolina	10	119	17	15	82	1	59	147	36
Georgia	3	68	5	5	30	0	102	85	7
Florida	-------	37	-------	-------	14	0	-------	18	-------
Kentucky [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Tennessee	8	125	6	5	69	5	90	134	36
Alabama	10	136	12	6	71	1	190	58	37
Mississippi	97	819	5	25	63	10	78	101	159
Arkansas	4	97	8	9	43	3	-------	87	9
Louisiana	3	86	4	0	31	6	[1] 86	151	11
Oklahoma [3]	8	119	2	1	48	10	37	117	11
Texas	-------	19	-------	-------	10	-------	-------	25	-------
Montana	70	25	97	2	75	7	95	63	91
Idaho	57	38	35	33	87	25	80	82	8
Wyoming	42	5	27	11	74	11	5	48	95
Colorado	27	30	13	84	55	1	58	34	66
New Mexico	6	42	11	-------	23	0	119	82	68
Arizona	14	43	27	19	41	0	280	73	8
Utah [2]	-------	-------	-------	-------	-------	-------	-------	-------	-------
Nevada	26	-------	13	-------	52	0	[1] 26	70	-------
Washington	60	23	25	15	96	20	161	24	139
Oregon	37	10	31	36	30	21	35	42	37
California	43	47	61	43	67	4	192	24	119

[1] Pulmonary. [2] Reports received weekly. [3] Exclusive of Oklahoma City and Tulsa.

ADMISSIONS TO HOSPITALS FOR THE INSANE, JULY, 1929

Reports for the month of July, 1929, showing new admissions to hospitals for the care and treatment of the insane were received by the Public Health Service from 121 hospitals, located in 40 States, the District of Columbia, and the Territory of Hawaii. The 121 hospitals had 185,226 patients on July 31, 1929, 98,946 males and 86,280 females—115 males per 100 females.

The following table shows the number of new admissions for the month of July, 1929, by psychoses:

Psychoses	Number of first admissions		
	Male	Female	Total
1. Traumatic psychoses	18	3	21
2. Senile psychoses	170	141	311
3. Psychoses with cerebral arteriosclerosis	217	130	347
4. General paralysis	214	48	262
5. Psychoses with cerebral syphilis	30	10	40
6. Psychoses with Huntington's chorea	3	3	6
7. Psychoses with brain tumor	4	1	5
8. Psychoses with other brain or nervous disease	23	17	40
9. Alcoholic psychoses	183	20	203
10. Psychoses due to drugs and other exogenous toxins	20	9	29
11. Psychoses with pellagra	22	55	77
12. Psychoses with other somatic diseases	50	51	101
13. Manic-depressive psychoses	189	281	470
14. Involution melancholia	25	62	87
15. Dementia præcox (schizophrenia)	348	283	631
16. Paranoia and paranoid conditions	30	36	66
17. Epileptic psychoses	62	22	84
18. Psychoneuroses and neuroses	25	46	71
19. Psychoses with psychopathic personality	25	13	38
20. Psychoses with mental deficiency	68	62	130
21. Undiagnosed psychoses	142	118	260
22. Without psychosis	142	65	207
Total	2,010	1,476	3,486

During the month of July, 1929, there were 3,486 new admissions to the institutions, 57.7 per cent of these being males and 42.3 per cent females—136 males per 100 females. Four hundred and sixty-seven of the new admissions were reported to be undiagnosed or "without psychosis." There were 3,019 new admissions for whom provisional diagnoses were made. Of these 3,019 patients, dementia præcox was the diagnosis in 20.9 per cent of the cases; manic-depressive psychoses in 15.6 per cent; psychoses with cerebral arteriosclerosis in 11.5 per cent; senile psychoses in 10.3 per cent; and 8.7 per cent of these first admissions were diagnosed as cases of general paralysis. These five classes accounted for 2,021 cases, or 66.9 per cent of the new admissions for whom a diagnosis was given.

The following table shows the number of patients in hospitals and on parole on July 31, 1929:

	Total patients on books		
	Male	Female	Total
Total patients on books last day of month:			
In hospitals	88, 703	78, 384	167, 087
On parole or otherwise absent, but still on books	10, 243	7, 896	18, 139
Total	98, 946	86, 280	185, 226

Of the 185,226 patients, 10,243 males and 7,896 females were on parole or otherwise absent but still on the books at the end of the month—10.4 per cent of the males, 9.2 per cent of the females, and 9.8 per cent of the total being absent.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 94 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,045,000. The estimated population of the 88 cities reporting deaths is more than 31,530,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Week ended November 28, 1931, and November 29, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	2, 078	1, 544	
94 cities	540	545	980
Measles:			
45 States	2, 414	2, 330	
94 cities	578	673	
Meningococcus meningitis:			
46 States	59	89	
94 cities	35	37	
Poliomyelitis:			
46 States	108	124	
Scarlet fever:			
46 States	3, 611	3, 336	
94 cities	988	1, 096	996
Smallpox:			
46 States	383	428	
94 cities	16	51	19
Typhoid fever:			
46 States	411	396	
94 cities	43	64	48
Deaths reported			
Influenza and pneumonia:			
88 cities	567	706	
Smallpox:			
88 cities	0	0	

City reports for week ended November 28, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	9	1	0	----------	0	2	1	2
New Hampshire:								
Concord	0	0	0	----------	0	0	0	0
Nashua	0	0	0	----------	0	0	0	0
Vermont:								
Barre	0	C	1	----------	0	1	0	0
Massachusetts:								
Boston	32	34	14	----------	0	3	8	22
Fall River	2	4	0	----------	0	2	1	1
Springfield	3	5	0	----------	0	2	10	0
Worcester	7	6	5	----------	0	1	51	1
Rhode Island:								
Pawtucket	0	2	0	----------	0	0	0	7
Providence	24	9	8	----------	0	120	2	0
Connecticut:								
Bridgeport	2	5	0	----------	0	0	0	3
Hartford	4	5	0	1	0	0	5	4
New Haven	30	1	0	----------	0	0	1	1
MIDDLE ATLANTIC								
New York:								
Buffalo	49	15	10	----------	0	7	0	16
New York	74	165	92	15	10	28	27	114
Rochester	8	4	0	----------	0	10	38	3
Syracuse	19	2	0	----------	0	1	6	4
New Jersey:								
Camden	2	7	3	1	2	1	1	3
Newark	14	16	3	3	0	3	1	6
Trenton	5	2	0	1	1	0	9	3
Pennsylvania:								
Philadelphia	69	59	9	3	6	6	19	42
Pittsburgh	46	25	12	----------	1	128	55	25
Reading	9	2	0	----------	0	0	2	3
Scranton	4	----------	0	----------	0	0	0	0
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	6	11	8	----------	0	1	0	4
Cleveland	98	38	8	7	0	6	60	12
Columbus	5	7	0	1	2	0	2	3
Toledo	52	8	3	1	1	2	1	2
Indiana:								
Fort Wayne	4	5	5	----------	0	0	0	0
Indianapolis	46	11	2	----------	0	0	0	11
South Bend	----------	2	----------	----------	----------	----------	----------	----------
Terre Haute	9	1	0	----------	0	0	0	1
Illinois:								
Chicago	94	118	61	10	3	12	6	27
Peoria	6	0	5	----------	0	0	0	1
Springfield	0	2	0	----------	0	0	0	2
Michigan:								
Detroit	51	60	29	4	1	0	16	16
Flint	21	3	0	----------	0	0	11	2
Grand Rapids	1	1	0	----------	0	0	0	3

City reports for week ended November 28, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—Con.								
Wisconsin:								
Kenosha	3	1	1		0	0	5	0
Madison	12	1	9			0	0	
Milwaukee	46	14	3	2	2	3	25	3
Racine	12	2	0		0	0	18	0
Superior	1	0	0		0	2	9	1
WEST NORTH CENTRAL								
Minnesota:								
Duluth	1	0	0		1	0	0	1
Minneapolis	45	22	4		0	2	11	4
St. Paul		7						
Iowa:								
Davenport	8	1	0			0	0	
Des Moines	0	2	2			0	0	
Sioux City	16	2	4[1]			0	1	
Waterloo	7	0	0			1	0	
Missouri:								
Kansas City	22	8	12		0	1	1	10
St. Joseph	1	1	5		0	0	0	2
St. Louis	15	44	20	1		0	2	11
North Dakota:								
Fargo	7	0	0		0	0	0	0
Grand Forks	0	0	0			0	0	
South Dakota:								
Aberdeen	13	0	0			18	0	
Nebraska:								
Lincoln	3	1	0		0	0	3	0
Omaha	24	9	11		0	2	0	8
Kansas:								
Topeka	2	2	1		0	0	2	0
Wichita	4	2	14		0	1	0	1
SOUTH ATLANTIC								
Delaware:								
Wilmington	0	2	2		0	0	0	1
Maryland:								
Baltimore	26	24	10	3	1	2	34	26
Cumberland	1	0	0		0	1	0	1
Frederick	0	0	1		0	0	0	0
District of Columbia:								
Washington	9	17	10		0	5	0	9
Virginia:								
Lynchburg	2	3	5		0	0	1	0
Norfolk	0	3	6		0	0	0	6
Richmond	2	17	17		1	0	0	8
Roanoke	2	4	10		0	0	1	0
West Virginia:								
Charleston	8	2	1		0	0	0	2
Huntington	0		2		0	0	0	0
Wheeling	4	1	0		0	0	0	1
North Carolina:								
Raleigh	15	2	3		0	2	0	1
Wilmington	9	0	1		0	1	0	0
Winston-Salem	4	5	2	2	0	2	1	2
South Carolina:								
Charleston	1	1	1	22	0	0	0	1
Columbia	1	1	0		0	0	0	0
Greenville	2	2	0		0	0	0	0
Georgia:								
Atlanta	4	7	0	7	0	0	1	10
Brunswick	0	0	0		0	0	5	0
Savannah	0	2	3	2	1	1	0	1
Florida:								
Miami	4	2	2		0	0	0	1
Tampa	0	3	1		0	0	1	1

[1] 1 case nonresident.

City reports for week ended November 28, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0	-	0	1	0	1
Lexington	0	-	0	-	0	0	1	1
Louisville	5	-	3	-	1	0	0	6
Tennessee:								
Memphis	6	9	7	-	0	0	0	2
Nashville	2	3	5	-	0	0	0	4
Alabama:								
Birmingham	0	8	9	5	1	0	0	5
Mobile	1	1	2	-	1	0	0	5
Montgomery	0	3	2	-	-	5	1	-
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	-	2	-	-	-	-	-	-
Little Rock	0	2	2	-	0	1	0	1
Louisiana:								
New Orleans	0	15	12	4	4	1	0	8
Shreveport	2	0	2	1	0	5	0	1
Oklahoma:								
Muskogee	2	-	9	-	0	0	0	0
Oklahoma City	2	4	9	18	0	1	0	4
Tulsa	0	5	12	-	-	0	0	-
Texas:								
Dallas	4	19	18	-	0	0	0	1
Fort Worth	2	6	19	-	0	0	0	1
Galveston	0	1	3	-	0	0	0	2
Houston	0	10	18	-	0	0	0	4
San Antonio	0	5	5	-	1	0	0	2
MOUNTAIN								
Montana:								
Billings	0	0	0	-	0	126	0	0
Great Falls	0	0	0	-	0	1	0	3
Helena	0	0	0	-	0	14	0	0
Missoula	1	0	0	-	0	0	0	1
Idaho:								
Boise	1	0	0	-	0	0	0	0
Colorado:								
Denver	40	10	3	-	2	1	4	9
Pueblo	6	1	0	-	0	0	0	1
New Mexico:								
Albuquerque	5	1	0	-	0	0	0	1
Arizona:								
Phoenix	0	0	1	-	0	0	0	0
Utah:								
Salt Lake City	64	4	0	-	1	0	1	1
Nevada:								
Reno	-	0	-	-	-	-	-	-
PACIFIC								
Washington:								
Seattle	39	5	0	-	-	25	13	-
Spokane	7	2	0	-	-	0	0	-
Tacoma	17	4	1	-	0	0	4	2
California:								
Los Angeles	17	36	33	24	1	3	8	18
Sacramento	5	3	0	-	0	31	0	3
San Francisco	35	14	1	4	2	4	4	8

City reports for week ended November 28, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
NEW ENGLAND											
Maine:											
Portland	2	3	0	0	0	0	1	0	0	1	24
New Hampshire:											
Concord	1	0	0	0	0	0	0	0	0	0	7
Nashua	0	0	0	0	0	0	0	0	0	0	1
Vermont:											
Barre	0	0	0	0	0	0	0	0	0	0	2
Massachusetts:											
Boston	57	56	0	0	0	9	2	0	0	15	188
Fall River	3	7	0	0	0	5	0	0	0	2	22
Springfield	5	5	0	0	0	1	0	0	0	2	32
Worcester	12	20	0	0	0	2	0	0	0	8	47
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	18
Providence	11	10	0	0	0	0	0	0	0	8	57
Connecticut:											
Bridgeport	6	8	0	0	0	4	0	0	0	2	32
Hartford	5	5	0	0	0	4	0	1	1	2	47
New Haven	3	0	0	0	0	0	0	0	0	3	30
MIDDLE ATLANTIC											
New York:											
Buffalo	21	25	0	0	0	9	1	0	0	23	123
New York	107	125	0	0	0	82	14	6	1	122	1,257
Rochester	7	33	0	0	0	0	1	0	0	8	67
Syracuse	8	13	0	0	0	0	0	0	0	32	49
New Jersey:											
Camden	3	2	0	0	0	1	0	0	0	0	37
Newark	12	11	0	0	0	10	0	0	0	50	92
Trenton	3	11	0	0	0	2	0	0	0	2	26
Pennsylvania:											
Philadelphia	65	61	0	0	0	26	4	2	0	151	412
Pittsburgh	34	47	0	0	0	9	0	0	0	13	151
Reading	2	1	0	0	0	1	0	0	0	2	29
Scranton	2	11	------	0	0	0	------	0	0	2	------
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	17	41	0	0	0	5	1	2	0	3	98
Cleveland	30	33	0	0	0	13	1	0	0	96	166
Columbus	10	15	1	0	0	1	0	1	2	4	78
Toledo	11	9	0	0	0	2	0	4	0	10	69
Indiana:											
Fort Wayne	3	1	0	0	0	0	0	0	0	0	21
Indianapolis	14	4	2	0	0	7	0	0	0	8	------
South Bend	4	------	0	------	------	------	0	------	------	------	------
Terre Haute	3	1	0	0	0	0	0	1	0	0	18
Illinois:											
Chicago	103	93	1	0	0	36	3	2	0	152	582
Peoria	------	3	------	0	0	0	------	0	0	5	26
Springfield	3	6	0	0	0	0	0	0	0	2	14
Michigan:											
Detroit	79	46	0	0	0	25	1	3	0	55	247
Flint	11	9	0	0	0	0	0	0	0	5	20
Grand Rapids	9	2	0	0	0	0	0	0	0	2	81
Wisconsin:											
Kenosha	2	2	0	0	0	1	0	0	0	8	------
Madison	2	0	0	0	------	------	0	0	------	0	------
Milwaukee	17	19	0	0	0	7	0	0	0	73	96
Racine	4	2	0	0	0	1	0	0	0	1	9
Superior	3	4	0	0	0	0	0	0	0	0	10
WEST NORTH CENTRAL											
Minnesota:											
Duluth	10	1	0	0	0	2	0	0	0	0	21
Minneapolis	37	15	0	0	0	3	1	0	0	8	76
St. Paul	16	------	1	------	------	------	0	------	------	------	------

City reports for week ended November 28, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths all causes
WEST NORTH CENTRAL—con.											
Iowa:											
Davenport	1	1	1	1			0	0		0	
Des Moines	9	11	1	3			0	0		0	26
Sioux City	2	4	0	5			0	0		0	
Waterloo	2	0	1	0			0	0		3	
Missouri:											
Kansas City	14	11	0	0	0	2	0	0	0	7	77
St. Joseph	3	1	0	0	0	0	0	0	0	0	25
St. Louis	36	10	0	0	0	13	2	0	1	43	229
North Dakota:											
Fargo	2	1	0	0	0	0	0	0	0	3	9
Grand Forks	0	0	1				0	0		0	
South Dakota:											
Aberdeen	0	3	0	0			0	0		7	
Nebraska:											
Lincoln	1	0		0	0	0	0	1	0	3	
Omaha	6	2	2	1	0	0	0	0	1	2	43
Kansas:											
Topeka	3	4	0	0	0	0	0	4	0	2	9
Wichita	5	9	0	0	0	0	0	0	0	1	22
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	1	0	0	0	0	0	0	0	1	28
Maryland:											
Baltimore	20	21	0	0	0	7	3	5	2	108	173
Cumberland	0	4	0	0	0	0	0	1	0	1	7
Frederick	0	1	0	0	0	0	0	0	0	1	2
District of Columbia:											
Washington	17	18	0	0	0	8	1	2	0	14	136
Virginia:											
Lynchburg	1	1	0	0	0	0	0	0	0	2	7
Norfolk	4	9	0	0	0	1	0	0	0	0	
Richmond	9	22	0	0	0	5	0	0	0	5	53
Roanoke	3	1	0	0	0	1	0	0	0	0	10
West Virginia:											
Charleston	2	0	0	0	0	1	0	[1] 6	2	2	21
Huntington		1		0	0	0		0	0	0	
Wheeling	2	2	0	0	0	0	0	0	0	1	16
North Carolina:											
Raleigh	1	3	0	0	0	2	0	0	0	0	9
Wilmington	1	0	0	0	0	3	0	0	0	11	9
Winston-Salem	2	5	0	0	0	4	0	0	0	9	22
South Carolina:											
Charleston	1	4	0	0	0	0	0	1	1	0	22
Columbia	0	0	0	0	0	0	0	0	0	0	
Greenville		1	0	0	0	0	0	0	0	0	
Georgia:											
Atlanta	7	6	0	0	0	5	1	0	0	1	90
Brunswick	0	0	0	0	0	0	0	0	0	0	4
Savannah	1	0	0	0	0	1	0	0	0	0	37
Florida:											
Miami	1	0	0	0	0	1	0	0	0	0	16
Tampa	1	0	0	0	0	1	0	2	0	0	22
EAST SOUTH CENTRAL											
Kentucky:											
Covington	2	2	0	0	0	0	0	0	0	0	12
Lexington		1		0	0	1		0	0	6	11
Louisville		10		0	0	3		1	1	16	65
Tennessee:											
Memphis	7	5	0	1	0	4	2	1	1	13	72
Nashville	3	0	0	0	0	4	0	0	0	2	47
Alabama:											
Birmingham	6	13	0	0	0	6	1	0	0	0	51
Mobile	0	0	0	0	0	1	0	0	0	0	29
Montgomery	1	1	0	0			0	0		1	

[1] 4 cases nonresidents.

City reports for week ended November 28, 1931 – Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
Little Rock	3	2	1	0	0	1	0	0	0	0	-------
Louisiana:											
New Orleans	9	13	0	6	0	10	2	0	0	0	128
Shreveport	1	1	0	0	0	2	1	0	0	3	30
Oklahoma:											
Muskogee	-------	3	-------	0	0	0	-------	0	0	2	-------
Oklahoma City	4	4	1	0	0	2	0	4	1	0	83
Tulsa	3	1	0	0	-------	-------	0	0	-------	1	-------
Texas:											
Dallas	8	7	1	0	0	2	1	0	0	0	50
Fort Worth	3	10	0	0	0	4	0	1	0	0	23
Galveston	0	1	0	0	0	0	0	1	0	0	5
Houston	3	3	0	0	0	3	0	1	0	1	60
San Antonio	2	0	0	0	0	7	0	0	0	0	63
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	0	0	0	3
Great Falls	2	1	1	0	0	0	0	0	0	0	7
Helena	0	0	0	0	0	0	0	0	0	0	6
Missoula	0	6	0	0	0	0	0	0	0	0	4
Idaho:											
Boise	0	0	0	0	0	0	0	0	0	0	3
Colorado:											
Denver	13	9	0	0	0	5	0	0	1	3	74
Pueblo	1	1	0	0	0	0	0	0	0	0	9
New Mexico:											
Albuquerque	0	3	0	0	0	4	0	0	0	0	10
Arizona:											
Phoenix	1	1	0	0	0	6	0	0	0	0	-------
Utah:											
Salt Lake City	3	2	2	0	0	1	1	0	0	0	27
Nevada:											
Reno	0	-------	0	-------	-------	-------	0	-------	-------	-------	-------
PACIFIC											
Washington:											
Seattle	9	9	2	0		-	1	0		0	-
Spokane	8	1	2	1		-	0	0		0	
Tacoma	3	2	1	0	0	1	0	0	0	4	36
California:											
Los Angeles	25	35	1	0	0	24	1	1	0	9	207
Sacramento	3	3	0	0	0	0	0	0	0	0	26
San Francisco	13	5	1	2	0	8	1	0	0	8	161

Division, State, and city	Meningococcus meningitis: Cases	Meningococcus meningitis: Deaths	Lethargic encephalitis: Cases	Lethargic encephalitis: Deaths	Pellagra: Cases	Pellagra: Deaths	Poliomyelitis (infantile paralysis): Cases, estimated expectancy	Poliomyelitis (infantile paralysis): Cases	Poliomyelitis (infantile paralysis): Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	1	0	0	0	0	0	2	1	0
Fall River	0	0	0	0	0	0	0	1	0
Springfield	0	0	0	0	0	0	0	3	0
Worcester	0	0	0	0	0	0	1	1	0
Connecticut:									
Hartford	0	0	0	0	0	0	0	1	0

City reports for week ended November 28, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
MIDDLE ATLANTIC									
New York:									
New York	6	4	2	1	0	0	3	2	0
Rochester	0	0	0	0	0	0	0	1	0
Syracuse	1	0	0	0	0	0	1	0	0
New Jersey:									
Newark	2	0	0	0	0	0	0	2	0
Pennsylvania:									
Philadelphia	1	1	0	0	0	0	0	1	0
Pittsburgh	2	2	0	0	0	0	0	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	1	0	0	0	0	0	0	0	0
Cleveland	1	1	0	0	0	0	1	0	0
Indiana:									
Indianapolis	0	1	0	0	0	0	0	0	0
Illinois:									
Chicago [1]	7	1	0	0	0	0	1	3	1
Michigan:									
Detroit	2	1	0	0	0	0	1	0	0
Flint	0	0	1	0	0	0	0	0	0
Grand Rapids	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Minneapolis	2	1	0	0	0	0	0	1	0
Iowa:									
Waterloo	1	0	0	0	0	0	0	0	0
SOUTH ATLANTIC [3]									
Maryland:									
Baltimore	1	1	0	1	0	0	0	1	1
North Carolina:									
Winston-Salem	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston [3]	0	0	0	0	7	0	0	0	0
Georgia: [2]									
Savannah [2]	0	0	0	0	1	1	0	0	0
Florida:									
Miami	0	0	0	0	1	0	0	0	0
EAST SOUTH CENTRAL									
Tennessee:									
Memphis	1	0	0	0	0	0	0	0	0
Alabama:									
Birmingham	0	1	0	0	0	0	0	1	0
WEST SOUTH CENTRAL [3]									
Louisiana:									
New Orleans	0	0	0	0	1	0	0	0	0
Texas:									
Dallas	0	0	0	0	1	1	0	0	0
Houston	1	1	0	0	0	0	0	0	0
MOUNTAIN									
Colorado:									
Denver	0	1	0	0	0	0	0	0	0
Utah:									
Salt Lake City	2	1	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Tacoma	1	0	0	0	0	0	0	2	0
California:									
Los Angeles	1	0	0	0	0	1	0	0	0
Sacramento	1	0	0	0	0	0	0	0	0
San Francisco [3]	0	1	0	0	1	0	1	0	0

[1] Rabies in man: 1 case and 1 death.
[2] Typhus fever, 4 cases: 1 case at Norfolk, Va.; 1 case at Atlanta, Ga.; and 2 cases at Savannah, Ga.
[3] Dengue, 2 cases and 1 death: 1 case at Charleston, S. C.; 1 death at Little Rock, Ark.; and 1 case at San Francisco, Calif.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended November 28, 1931, compared with those for a like period ended November 29, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, October 25 to November 28, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930
98 cities	85	90	94	[2] 82	96	89	[3] 96	100	[4] 85	87
New England	63	92	84	85	50	82	70	123	67	87
Middle Atlantic	41	44	32	33	52	44	53	52	58	48
East North Central	82	130	97	109	80	128	91	124	[5] 72	122
West North Central	174	93	155	[2] 77	184	107	174	110	[6] 151	110
South Atlantic	146	116	182	86	146	120	172	154	144	66
East South Central	204	293	268	215	227	185	169	275	145	138
West South Central	162	101	203	199	233	160	[3] 238	171	[7] 207	153
Mountain	9	35	44	123	61	26	17	26	[8] 27	79
Pacific	92	67	100	93	127	63	98	63	67	95

MEASLES CASE RATES

	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930
98 cities	37	59	44	[2] 59	55	91	[3] 87	126	[4] 91	107
New England	115	138	161	128	238	172	233	179	315	162
Middle Atlantic	30	27	27	34	38	68	92	76	82	69
East North Central	18	18	18	16	18	17	20	31	[5] 15	28
West North Central	11	294	15	[2] 282	17	502	19	767	[6] 15	649
South Atlantic	12	20	12	48	10	26	34	64	28	44
East South Central	23	42	12	84	12	18	29	149	35	66
West South Central	17	0	27	0	24	0	[3] 15	3	[7] 24	10
Mountain	61	414	444	229	400	308	757	326	[8] 1,277	282
Pacific	125	24	104	24	135	32	149	28	123	10

SCARLET FEVER CASE RATES

	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930
98 cities	139	161	169	[2] 169	170	187	[3] 189	195	[4] 156	174
New England	142	213	202	225	221	276	260	237	262	264
Middle Atlantic	127	132	134	133	131	126	163	159	147	148
East North Central	161	218	239	231	215	287	241	263	[5] 171	221
West North Central	136	163	140	[2] 140	149	143	132	219	[6] 123	139
South Atlantic	158	166	190	158	239	154	259	216	176	188
East South Central	198	245	99	293	198	275	145	209	122	215
West South Central	47	66	95	91	122	118	[3] 63	94	[7] 93	132
Mountain	165	344	252	282	313	388	218	282	[8] 198	229
Pacific	133	47	121	95	96	99	129	87	108	83

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] Waterloo, Iowa, not included.
[3] New Orleans, La., not included.
[4] South Bend, Ind., St. Paul, Minn., Fort Smith, Ark., and Reno, Nev., not included.
[5] South Bend, Ind., not included.
[6] St. Paul, Minn., not included.
[7] Fort Smith, Ark., not included.
[8] Reno, Nev., not included.

Summary of weekly reports from cities, October 25 to November 28, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

SMALLPOX CASE RATES

	Week ended—									
	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930
98 cities	2	3	3	[2] 2	1	4	[3] 1	3	[4] 3	8
New England	0	0	0	0	0	0	0	0	0	0
Middle Atlantic	0	0	0	0	0	0	0	0	0	0
East North Central	1	1	0	4	0	2	0	0	[5] 0	4
West North Central	6	19	11	[2] 6	4	21	10	23	[6] 13	68
South Atlantic	0	0	0	0	0	0	0	0	0	0
East South Central	0	0	12	0	6	0	0	0	6	0
West South Central	0	3	3	7	3	3	[3] 0	3	[7] 21	3
Mountain	0	9	0	9	9	0	0	44	[8] 0	35
Pacific	12	14	6	6	4	18	6	6	6	8

TYPHOID FEVER CASE RATES

	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930
98 cities	16	14	12	[2] 11	12	15	[3] 11	15	[4] 7	10
New England	5	5	10	5	7	24	10	17	2	12
Middle Atlantic	11	9	11	5	6	4	8	5	4	3
East North Central	16	7	6	9	11	5	5	9	[5] 6	4
West North Central	19	14	21	[2] 4	13	19	8	23	[6] 0	8
South Atlantic	38	32	80	82	36	84	24	28	34	32
East South Central	6	102	17	24	23	48	41	12	6	12
West South Central	17	14	30	28	24	87	[3] 24	84	[7] 7	70
Mountain	0	0	9	18	0	26	9	53	[8] 0	9
Pacific	25	18	0	16	10	10	18	10	2	6

INFLUENZA DEATH RATES

	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930
91 cities	5	9	7	9	8	9	[3] 7	10	[9] 7	9
New England	10	2	12	2	14	5	7	7	0	2
Middle Atlantic	4	9	8	12	10	8	6	7	9	11
East North Central	6	6	5	6	2	9	4	5	[5] 5	7
West North Central	0	9	6	3	6	6	6	6	[6] 3	0
South Atlantic	4	18	4	10	6	6	12	24	6	10
East South Central	6	13	0	26	0	39	25	13	13	26
West South Central	0	21	17	14	7	28	[3] 10	36	17	14
Mountain	17	18	17	9	27	9	17	62	[8] 27	26
Pacific	2	2	5	7	12	5	5	7	7	7

PNEUMONIA DEATH RATES

	Oct. 31, 1931	Nov. 1, 1930	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930
91 cities	82	99	88	101	86	115	[3] 102	116	[9] 86	109
New England	90	104	67	89	101	114	84	126	99	77
Middle Atlantic	96	109	107	116	106	129	118	133	98	118
East North Central	63	87	64	74	52	85	70	82	[5] 52	78
West North Central	75	96	80	87	88	78	115	138	[6] 119	93
South Atlantic	113	134	117	152	97	172	152	156	122	180
East South Central	101	65	120	136	151	188	183	175	107	136
West South Central	80	103	66	110	55	103	[3] 95	114	66	153
Mountain	52	167	139	194	148	220	174	167	[8] 126	229
Pacific	46	32	53	42	70	67	50	50	74	70

[2] Waterloo, Iowa, not included.
[3] New Orleans, La., not included.
[4] South Bend, Ind., St. Paul, Minn., Fort Smith, Ark., and Reno, Nev., not included.
[5] South Bend, Ind., not included.
[6] St. Paul, Minn., not included.
[7] Fort Smith, Ark., not included.
[8] Reno, Nev., not included.
[9] South Bend, Ind., St. Paul, Minn., and Reno, Nev., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended November 21, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended November 21, 1931, as follows:

Province	Cerebrospinal fever	Dysentery	Lethargic encephalitis	Influenza	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]							
Nova Scotia	1			5			2
New Brunswick [1]							
Quebec					22		29
Ontario	2				5	3	27
Manitoba			1			1	2
Saskatchewan						12	
Alberta					1		
British Columbia		1					
Total	3	1	1	5	28	16	60

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended November 21, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended November 21, 1931, as follows:

Disease	Cases	Disease	Cases
Chicken pox	121	Poliomyelitis	22
Diphtheria	58	Scarlet fever	91
Erysipelas	5	Tuberculosis	16
German measles	4	Typhoid fever	29
Measles	169	Whooping cough	44
Mumps	18		

Ontario—Communicable diseases—Comparative—Five weeks ended October 31, 1931.—Cases of certain communicable diseases were reported in the Province of Ontario, Canada, for the five weeks ended October 31, 1931, and the corresponding period of 1930, as follows:

Disease	1930		1931	
	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis	7	2	11	6
Chancroid	3			
Chicken pox	380		324	
Diphtheria	373	11	348	13
Dysentery		17	20	7
Erysipelas			4	
German measles	7		21	
Gonorrhea	95		371	
Influenza	9	5	3	1
Jaundice			8	
Lethargic encephalitis	1	1	2	
Measles	57		307	
Mumps	152		313	
Paratyphoid fever	8		30	1
Pneumonia		101		106
Poliomyelitis	174	18	31	1
Puerperal fever	1			
Scarlet fever	435	1	269	1
Smallpox	34		19	
Syphilis	109	3	189	1
Tetanus		1	2	1
Trachoma			1	
Trench mouth			12	
Tuberculosis	134	48	176	64
Tularæmia			3	
Typhoid fever	126	11	146	8
Undulant fever	13	1	7	
Whooping cough	315	2	389	

CUBA

Provinces—Communicable diseases—Four weeks ended September 26, 1931.—During the four weeks ended September 26, 1931, cases of certain communicable diseases were reported in the provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		1		3			4
Diphtheria		10		5		2	17
Malaria		6		2	3	14	25
Measles		44	3				47
Paratyphoid fever			1	2			3
Scarlet fever		1	1				2
Typhoid fever		20	4	30	2	7	63

Habana—Communicable diseases—Four weeks ended October 10, 1931.—During the four weeks ended October 10, 1931, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	8	1	Scarlet fever	2	
Leprosy	1		Tuberculosis	27	11
Malaria [1]	8		Typhoid fever [1]	10	2
Measles	46				

[1] Many of the cases of malaria and typhoid fever are from the island of Cuba outside of Habana.

DENMARK

Communicable diseases—September, 1931.—During the month of September, 1931, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	6	Paratyphoid fever	113
Chicken pox	19	Poliomyelitis	6
Diphtheria and croup	259	Scabies	654
Erysipelas	280	Scarlet fever	228
German measles	1	Syphilis	103
Gonorrhea	1,002	Tetanus	2
Influenza	5,245	Typhoid fever	18
Lethargic encephalitis	12	Undulant fever (Bac abort Bang)	54
Measles	900	Whooping cough	1,694
Mumps	101		

JAMAICA

Communicable diseases—Four weeks ended November 7, 1931.—During the four weeks ended November 7, 1931, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica, outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox	2	4	Puerperal fever		3
Diphtheria		1	Scarlet fever	1	1
Dysentery		5	Tuberculosis	46	73
Leprosy		3	Typhoid fever	15	71
Poliomyelitis		1			

PANAMA CANAL ZONE

Communicable diseases—October, 1931.—During the month of October, 1931, certain communicable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	17		Pneumonia		28
Diphtheria	9		Scarlet fever	1	
Dysentery (amoebic)	4		Tuberculosis		23
Leprosy	2	1	Typhoid fever	1	
Malaria	111	6	Whooping cough	12	1
Measles	18				

TRINIDAD

Port of Spain—Vital statistics—October, 1930, 1931.—The following statistics for the months of October, 1930 and 1931, are taken from a report issued by the public health department of Port of Spain, Trinidad:

	1930	1931		1930	1931
Number of births	201	155	Death rate per 1,000 population	16.8	14.9
Birth rate per 1,000 population	35.1	26.0	Deaths under 1 year	14	12
Number of deaths	96	89	Deaths under 1 year per 1,000 births	69.6	77.4

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14	21	28	Dec. 5, 1931
Ceylon: Colombo	C	1		3														1	
	D	1		3														1	
China:																			
Canton	C	1			1	1													
Hankow	C										8		5	18					
	D										6			1					
Shanghai	C		1	7	1	58	30	36	35	29	17	17	8						
	D					3	4	2	5	8			4						
Swatow	C	10	7																
Tientsin	C	10																	
	D	1																	
India	C	18,001	22,074	36,514	10,734	9,834	9,740	8,915	7,552	10,172									
	D	10,337	12,093	20,276	6,014	5,518	5,321	4,800	3,716	4,808									
Bombay	C		23	44	27	5	5	5	1	1	2		4	1			1		
	D		16	25	9	5	2	1		1	2			1			1		
Calcutta	C	292	237	110	10	3	15	18	18	23	3	7	14	13	19	28	22		
	D	168	155	30	4	2	3	6	6	12		5	9	4	10	14	10		
Chittagong	C											1							
Karikal	C			1	1			1	1										
	D			1	1			1											
Madras	C	9	4	6	3	1	1												
	D	4																	
Moulmein	C		1																
	D		1																
Negapatam	C				1														
Rangoon	C	4	4	1					1				1						
	D	2	1	1					1				1						
Vizagapatam	C	1																	
India (French):																			
Chandernagor	C	3	5	7		1	1		1				1						
	D	3	1	7		1	1		1				1						
Pondicherry	C	3	3	3	2			2		1									
	D	3	3	2	1			1											

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	12	19	26	October, 1931 3	10	17	24	31	November, 1931 7	14	21	28	Dec. 5, 1931
India (Portuguese)	C	1	2	2	1	2	25	6		17	19								
	D		1	2	1	1	10	6		10	4								
Indo-China (see also table below):																			
Cochin-China—Rachgia	C			P															
Pnompenh	C	1	5	2			1	1		1				2	2				
	D	1	2	1			1	1		1									
Saigon and Cholon	C	61	14								1								
	D	41	7								1								
Iraq:																			
Abulkhesib	C				6														
	D				3														
Amara	C			2	22	35	8	1			2	2	2			3	3		
	D			1	21	30	7	1				1	1			2	4		
Amara Province	C				6	11	106	73	32	21	15	27	13	7	15			3	
	D				5	4	67	44	29	24	14	17	10	6	8			2	
Basra	C			547	148		54	91	77	19	29	32	38	30	9	1			
	D			287	76		30	48	34	11	13	23	7	18	10	1			
Basra Province	C			5	14	6	10	23	26	14	1	1	3	7					
	D			2	10	3	7	10	9	8	1	1	1	4					
Dinwaniyah	C								1										
Dinwaniyah Province	C								15	8	14	24	22	1					
	D								11	6	5	22	10	5					
Iweniyah	C								22										
	D								15										
Kut Province	C													17	3				
	D													12	2				
Muntafiq Province	C				16	21	66	128	55	54	45	55	17	19	9	23	1	1	
	D				8	20	42	75	38	57	28	37	10	18	6	17	3		
Nasiriyah	C					22	50	16	4	4	15	7	4	7	6	7	2	6	
	D					15	40	20	3	4	18	3	3	6	3	6		7	
Suq-esh-Shuyukh	C				2														
	D				2														
Japan: Taiwan—Kelung	C														2				
Persia: [1]																			
Abadan	C											1		3			1		
Ahwaz	C											12		84	16	3			
	D											7		69	21	8			

Khorramabad	C															18		
	D															10		
Mohammerah	C											1						
Philippine Islands: [2] Provinces—																		
Capiz	C	4				9	9	17	49	21	5	4		7	5			4	16
	D	4				5	6	5	35	16	5	3		5	4			4	10
Cebu	C			3															
	D			3															
Iloilo	C	26	27																
	D	21	25																
Negros: Occidental	C	2																	
	D	1																	
Siam	C	4	3	1	1														
	D	2	1		1														
Bangkok	C	1	4	1	1														
	D	1	2																
On vessel:																			
S. S. City of Eastborne, at Calcutta, from Cocanada	C	1																	
S. S. Tairea, at Penang, from Calcutta	C	1																	
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C		1																
	D		1																
S. S. Kohistan, at Basra, from Bushire, Persia	C		2																
S. S. Cathay, at Kobe, Japan, from Shanghai	C			4															
	D			1															
S. S. Kasagi Maru, at Moji, from Shanghai	C					1													
S. S. Ankoo, at Nagasaki, from Shanghai	C						2												
	D						1												

Place		May, 1931	June, 1931	July, 1931	August, 1931			September, 1931			October, 1931			Nov. 1–10, 1931
					1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	
Indo-China (French) (see also table above):														
Cambodia [3]	C	117	308	241	12				8	6	1	16	2	3
	D	63	109	60	2				4	3	1	16	1	
Cochin-China [3]	C	174	140	143	39				9	9	11	2	1	4
	D	133	106	42	32				6	7	10	2	1	5

[1] On Oct. 23, 1931, cholera was reported at Mohammerah, Abadan, and Ahwaz, Persia. During the period from Oct. 22 to Nov. 7, 1931, 141 cases and 97 deaths were reported. The diagnosis of cholera was not confirmed upon bacteriological examination.

[2] Figures for cholera in the Philippine Islands are subject to correction.

[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	12	19	26	October, 1931 3	10	17	24	31	November, 1931 7	11	21	28	Dec. 5, 1931
Algeria:																			
Algiers	C			2															
Bone	C	1																	
Philippeville	C		1	2															
	D		1	1															
Argentina: San Juan Province	C		P																
Belgian Congo	C	1																	
	D	1																	
British East Africa (see also table below):																			
Tanganyika	C	17	6	8				4	5	2									
	D	19	6	2				4	1										
Uganda	C	298	418	285	59	59	107	84	53	62									
	D	287	469	251	61	58	107	83	52	63									
Ceylon: Colombo	C	2	1	6		1	1	1	1	1	2							1	
	D	2	1	6		1	1	1	1	1	1							1	
Plague-infected rats				8															
Chile: Santiago	C											1							
	D											1							
China:[1]																			
Shansi Province[2]	C													P					
Shensi Province	C													P					
Dutch East Indies:																			
Batavia and West Java	C	125	75	58	19	15	5	20	21	51		29	25		1				
	D	69	75	55	19	15	5	20	21	51		29	25						
Java and Madura	D	252	212	205	55	58	51	56	77	69	55	94	97	153					
Ecuador (see table below).																			
Egypt:																			
Alexandria	C	4	13	9	2	2		1	1				1	1	3	1		1	1
	D	4	5	3	1	1									1	1	1	1	
Assiout	C	11																	
	D	1																	
Beheira	C					2													
Dakahlia	C		1	2															
Deirout	C	3																	
	D	1																	

Gharbieh	C	1																	
	D	1																	
Girga	C		1																1
Kena	C																2		
	D																1		
Minieh	C	3	12												1	3			1
	D	1	4												1	1			
Port Said	C	3	5	2									1			1	2		2
	D	2	1														2		
Tanta	C			2		1		1									2		
	D																2		
France: Rouen—Devilleles	C													P					
Hawaii Territory:																			
Hawaii—Hamakua—Plague-infected rats				1															
Maui Island—																			
Haliimaile—Plague-infected rats								1											
Kula District	C			1															
	D			1															
Makawao—Plague-infected rats								1											
Paia—Plague-infected rats									1										
Paaulo—Plague-infected rats														1					
India	C	88	221	684	282	337	554	659	723	527									
	D	51	128	440	146	179	238	209	355	222									
Bassein	C		4	2		1	2	1	1				1						
	D		3	2		1	2	1	1				1						
Bombay	C		12								1		1					1	
	D		6								1							1	
Plague-infected rats		37	48	47	23	17	7	10	9	9	12	12	4		11	7	11		
Burma	C		16																
	D		10																
Madras Presidency	C	6	21		9	75	88	114		62	30	90							
	D	1	9		4	51	52	55		16	30	59							
Moulmein	C		9		P	5													
	D		1			4	3	2	2										
Rangoon	C	1	2	1	2	1							5				1		
	D	1	1	1	1	1							1				1		
Plague-infected rats		3	6	3	1	1	1	1	1	1	1	1	1						
Indo-China (see also table below): Pnompenh	C	3																	
	D	2																	
Iraq:																			
Baghdad	C	23	3	1		2	1							1			1		
	D	9	2			1											1		
Maudhan	C														2	1	1		
	D														1		1		
Madagascar (see also table below): Tamatave	C			1			2		1										
Morocco	C								10			8	2	2					
	D											8		4					

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April. On Sept. 19, 1931, 18 deaths were reported in Changchuanpu and new cases in Kaitung and Fengtien.

[2] On Oct. 17, 1931, plague epidemic was reported in western Shansi Province, China, with 2,000 deaths at Hsinghsien.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931				Dec. 5, 1931
						5	12	19	26	3	10	17	24	31	7	14	21	28	
Peru (see table below).																			
Senegal (see table below).																			
Siam	C	1		1	1	1	1	1	1	1	1	1					1		
	D	1			1	1		1	1	1		1							
Spain: Hospitalet—Barcelona Province	C			5	1			1	1	1			5		1	1			
	D			2				1		1			1						
Syria: Beirut	C		2	1			1	1	1	2					1				
Tunisia: Tunis	C	11					1				1								
	D	1																	
Union of South Africa:																			
Cape Province—Plague-infected rats				1															
Orange Free State	C						P					P							

Place		June, 1931	July, 1931	August, 1931	September, 1931	October, 1931	November, 1931
British East Africa (see also table above):							
Kenya	C	154	484	235	14	19	
Ecuador:							
Alamor Parish—Los Hoyos	C				1	3	
Amaluza Parish—Cangochapa	C					2	
Calvas Canton—							
Cariamanga	C				4	1	
Ovejeria	C		1				
Celicia Canton—Choras	C					1	
Loja Canton—							
Lapaz	C				20		
Naimuro	C					2	
Paterillo	C		1				
Tuburo	C					7	
Palas Canton—San Antonio	C				1	1	
Indo-China (see also table above)	C	2	1		1	3	
	D	2	1		1	1	
Madagascar (see also table above):							
Ambositra Province	C	15	1	2	1		
	D	15	1	1	1		
Antsirabe Province	C	12	13	22	19		
	D	12	12	22	19		
Miarinarivo Province	C		8	20	14		
	D		7	19	12		

Place		June, 1931	July, 1931	August, 1931	September, 1931	October, 1931	November, 1931
Madagascar—Continued		1	1	3	12		
Moramanga Province	C			3	11		
	D	10	5	45	65		
Tananarive Province	C	9	5	44	63		
	D	5	3	19	2		
Peru	C	1	2	14	2		
	D						
Senegal:			27	101	13	6	
Baol [1]	C		13	58	8	2	
	D	64	95	194	45	4	
Dakar [1]	C	55	73	106	31	4	
	D				13		10
Diourbel [1]	C				5		5
	D	4	3	2	10	1	14
Louga [1]	C	2	1	1	4	2	8
	D	2	34	2	1	7	
Rufisque [1]	C					1	
	D	12	16	26	12	7	8
Thies [1]	C	3	7	16	8	5	2
	D	3	3				
Tivaouane [1]	C	2	2				
	D						

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14	21	28
Algeria:																			
Algiers	C	1	8	1												1			
Constantine	C	1		1			1												
Belgian Congo	C	47	42																
Bolivia.[1]																			
Brazil: Porto Alegre (alastrim)	C	19	5	41	34	7	13	12	16	12	18		16	7	24				
	D			1	1	2		2			2				3				
British East Africa: Tanganyika	C	13	7	149	19	31	4	6	9	8	2	1,121	53						
	D			17				1	4	4		91	2						
British South Africa:																			
Northern Rhodesia	C			21	26							1							
Southern Rhodesia	C		1	2			1	2											
Canada:																			
Alberta	C			1	1					12				1	2	2	1		
British Columbia	C			2	5		1	1								1	1		
Manitoba	C		4						1									1	
Winnipeg	C							1											
Ontario	C	17	32	35	5	4		2		5	2	1	9		7	3	5	3	
Kingston	C						1												
Ottawa	C		1					1		5	2		1		4	3	5		
Sault Ste. Marie	C	1																	
Toronto	C	1	1																1
Quebec	C			1															
Saskatchewan	C	48	54	42	23	8	8	12	5	1	6	3	1	11	3	1	18	12	
Regina	C	2								1			1						
Chile:																			
Antofagasta	C			1															
Chanaral	C	1																	
Santiago	C													2					
	D													1					
China:																			
Amoy	C	6	4	2	1			1		1			1			1			
	D	3	3	2	1			1		1						1			
Canton	C	3	1	2		1										1	1	6	
Foochow	C	P	P	P	P		P		P		P		P		P				

Hankow	C	5	4	6	3					1					5				
Hong Kong	C	1																	
	D	2																	
Manchuria—																			
Harbin (see also table below)	C	3																	
Kwantung—Dairen	C	2	1																
Nanking	C	P			1														
Shanghai—																			
Foreigners only	C	7	11	3						35	29	17	17	1	6	2	12	16	
Including natives	D	7	13	6	1	1			1	5	8					1			
Tientsin	C	2		3															
Chosen (see table below).																			
Columbia:																			
Cali	D	1																	
Santa Marta	D							1											
Dutch East Indies:																			
Batavia and West Java	C	2																	
East Java and Madura	C	1																	
Eritrea	C	3		2		10													
	D					2													
France (see table below).																			
Great Britain:																			
England and Wales	C	570	287	187	91	33		19	45	45	41	34	41	39	42	71	68	55	
Bradford	C	8	5																
Leeds	C	2																	
London	C	183	122	54	26	3	9	5	15	5	17	15	21	20	27	55	27	33	
London and Great Towns	C	403	228	152	69	13	20	11	34	35	31	25	37	31	37	66	45	48	
	D		1	1															
Sheffield	C							1	1										
Greece (see table below).																			
Honduras: Puerto Castilla	C										1						1		
India	C	11,403	7,313	5,359	2,927	483	484	409	329	382	528								
	D	1,849	1,704	1,352	746	144	108	109	72	100	122								
Bassein	C	1																	
Bombay	C	9	6	6	2		1	2	2									1	
	D	4	5	6	1		1											1	
Calcutta	C	89	47	21	13	2	1	2		1				1					
	D	75	41	18	9	2	1	2		1				1					
Cochin	C	3			3					1	1	2	4	3		2			
Karachi	C		2		1									1					
	D		1																
Madras	C	8	2	2	1		1			1	5	6	1	2	2				
	D	6	1									2							
Negapatam	C		3	1	2	3		1			1		1				1		
Rangoon	C	13	6	3	4	1		1			2		1			1		2	
	D	5	2	1	2			1			1	1							
Tuticorin	C					2					4			1		4			
	D										1			1					
Vizagapatam	C	6	6	5	5	3	1	1	1	2	4			1					
	D	1	2	1	4	3	1	1	1		1			1					

[1] An epidemic of smallpox was reported on May 18, with 716 cases and 314 deaths since the middle of April, 1931, in Mendez Province, Bolivia.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 3–30, 1931	May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931 5	12	19	26	October, 1931 3	10	17	24	31	November, 1931 7	14	21	28
India (French):																			
Chandernagor	C	7	1	3															
	D	5		2															
Karikal	C	4	6	4	7		2	5			5		3			3			
	D	4	6	4	6		2	1			1		3			3			
Pondicherry Province	C	11	7	28	20	1	6	1	18	1	4	14	4	9	18				
	D	11	7	28	20	1	6	1	16	1	4	12	4	9	16				
India (Portuguese)	C	3																	
	D	1																	
Indo-China (see also table below):																			
Pnompenh	C	1	2																
	D	1																	
Saigon and Cholon	C	2		3	2	1		3	2	1	4	1			4	2	1	4	
	D	1		1	1	1		2		1	2				4	1		2	
Iraq:																			
Baghdad	C	3	1					1											1
	D	2																	1
Basra	C	2	1																
Mosul Liwa	C			1	1					5									
Ivory Coast (see table below).																			
Japan: Nagoya	C			1															
Mexico (see also table below):																			
Jalisco (State)—Guadalajara	D	2	1	3	2					1	1	2				2		1	
Mexico City and surrounding territory	C	45	25	22	10	2	2	1		2	1	2	2	1	1	1			
	D	11	13	8	2			1	1	1	2		1	1					
Monterrey	C		1												2				
Torreon	C	1	3				1	1			1								1
	D		2					1											
Vera Cruz	C	1																	
Morocco (see table below).																			
Netherlands: Friesland—Opsterland	C													[1] 1					
Nigeria	C									136	318								
	D									39	102								
Poland	C	3	3	18					1						1		1		
Portugal: Lisbon	C	67	48	45	37	10	21	18	17	16	11	6	15	19	16	17	26		
Rumania (see table below).																			

Siam	C	[illegible]	[illegible]	[illegible]				[illegible]											
	D	1	1	1															
Spain	C			7															
Straits Settlements	C	2			1														
	D	2																	
Sudan (Anglo-Egyptian)	C	6	1					32											
	D	2						6											
Syria (see table below).																			
Turkey (see table below).																			
Union of Socialist Soviet Republics (see table below).																			
Union of South Africa:																			
Cape Province	C	P																	
Natal	C				P			P											
Orange Free State	C	P	P	P	P	P	P			P	P	P							
Transvaal	C		P	P										P					
Upper Volta	C	53	12	2															
	D	1																	
On vessel:																			
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C				1														
S. S. Talodi at Suakin	C	1																	

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931			September, 1931			October, 1931			Nov. 1–10 1931
						1–10	11–20	21–31	1–10	11–20	21–30	1–10	11–20	21–31	
Indo-China (see also table above)	C	142	58	47	8	29				7	27	10	11	23	20
	D				4	11				4	8	3	3	10	4
Ivory Coast	C							7							
	D							4							
Syria: Beirut	C			1											

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
China: Harbin (see also table above)	C	7		13	10			
Chosen	C	11		1	4	2		
	D	3				1		
France	C	15	6	54	9	20		
Greece	C			3	1			

Place		March, 1931	April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931
Mexico (see also table above)	D		1	1	2			
Morocco	C	6	7	49	48	23	23	59
Rumania	C	1		1			1	
Turkey	C	1		9	1			
Union of Socialist Soviet Republics	C	1,903	1,516	1,345				

[1] Imported case.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931			
							5	12	19	26	3	10	17	24	31	7	14	21	28
Algeria:																			
Algiers	C	7	9	2									1		1	1			
Bone	C				2														
Constantine Department	C	22	26	3	1				2		1				11	16	11		
Oran	C	2	2		1		1										1		
Australia, Western	C	1																	
Bulgaria	C	16	30			1								1					
	D	4	6																
Chile:																			
Antofagasta	C														1				
Santiago	C													3					
China:																			
Manchuria—Harbin	C		16			1													
Shanghai	C			3	1					1									
Chosen (see table below).																			
Colombia: Cali	D						1												
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C		3					1	1										
Beheira	C															1			
Cairo	C					1													
Gharbieh	C																1		
	D																1		
Great Britain: Scotland—Fife County	C	1																	
Greece (see table below).																			
Guatemala (see table below).																			
Iraq: Baghdad	C	2																	
	D	2																	
Irish Free State:																			
Cork County—																			
Schull	C			1															
Skibbereen	C		2	1															
Kerry County—																			
Dingle	C	1																	
Listowel	C		1																

Limerick County—																			
Croom	C									1									
Glin	C							2		1									
Limerick	C			2	1														
Michelstown	C			1															
Rathkeale	C									1									
Mayo County—																			
Belmullet	C	1																	
Castlebar	C				1														
Westport	C				1														
Japan	C		1																
Lithuania (see table below).																			
Mexico:																			
Durango	D			1															
Guadalajara	D				1														
Mexico City, including municipalities in Federal District	C	75	46	53	19	5	1	2	2	4	2	5	3	7	3	1			
	D	33	19	12	10	1	1		2	2	2	2	2	2	2				
San Luis Potosi	D	2		4	1														
Torreon	C			1								1	1		3				
	D			1								1	1		5	1			
Morocco	C	42	101	102	8						1		3		1				
	D	4	6	8															
Palestine	C	4	5	2	11				4	4	1	1		2		1			
Panama Canal Zone—Balboa	C	2																	
Poland	C	298	97	53	31	6	2	1	2	2	8	3	1	2	6	6	6		
	D	18	4	5	2						1				1	2			
Rumania	C	169	80	11	23		4	6	3	1	6	7	4		12				
	D	18	13	5	2				1			2	1		3				
Syria	C	4																	
Tunisia: Tunis	C	29	73	2		1		1	1								3		
	D	3	4																
Turkey (see table below).																			
Union of Socialist Soviet Republics (see table below).																			
Union of South Africa:																			
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P					
Municipality of East London	C		1		1														
Natal	C	P	P	P	P			1					P						
Orange Free State	C	P	P	12									P	P					
Transvaal	C	P	P	P	P	P	P	P	P	P	P	1	P	P					
Yugoslavia (see table below).																			

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931
Chosen: Seoul	C	4		6	1			
	D	1		1	1			
Czechoslovakia	C	5	11	2				
Greece	C	22	6	9	2	13	9	
	D	3				2	1	
Guatemala	C			33	34	3		
	D			15	5			
Lithuania	C	34	10	13	8	2		
	D	5		2				
Turkey	C	32	13	11	9		16	1
Union of Socialist Soviet Republics	C	1,513	1,324					
Yugoslavia	C	43	14	2	3	1		
	D	5						

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		May 3-30, 1931	May 31-June 27, 1931	June 28-July 25, 1931	July 26-Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931			
							5	12	19	26	3	10	17	24	31	7	14	21	28
Brazil:																			
Alagoas State	C				3														
	D				2														
Maceio	D															1			
Ceara State	C	1	1		1														
	D	1			1														
Minas Geraes State	C	2																	
	D	1																	
Pernambuco Province	C					2													
	D					2													
Recife	C									1									
	D									1									
Rio de Janeiro State	C	2																	
Sergipe State	C		1																
British Cameroons: Mamfe	C	3	2																
	D	2																	
Colombia: Magdalena Province—Near Cienaga	C			4															
Gold Coast:																			
Akuse	C			2															
	D			1															
Dagomba District	C				4							1							
Kete Krachi	C																		
Kintampo	C			1															
	D			1															
Oda	C								1										
	D								1										
Salaga	C																		1
	D																		1
Tamale	C			2						2				1					2
	D			2						2									
Wale Wale	C				1														
	D				1														

Ivory Coast:																			
Bobo Dioulasso	C			1															
	D			1															
Grand Bassam	C				4			1											
	D				2			1											
Kong Circle	C			4															
Seguela	C				P														
Tehini	C															1			
Nigeria	C				1									1			1		
	D				1												1		
Senegal:																			
Podor (Hinterland)	C				1														
	D				1														
St. Louis	C									1									
Thies	C									1									
	D									1									
Sudan (French)	C			4															
Macina—Kayo Circle	C																2		
	D																2		
Togo (French): Atakpame—Anie Circle	C															1			
	D															1			
Upper Volta:																			
Banfora	C			2						2									
	D			1						1									
Dedougou	C														2				
Diarabakoko	C									2									
	D									1									
Ouagadougou	C					1				1			1						

UNITED STATES TREASURY DEPARTMENT

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SPECIAL ARTICLES

Typhus Virus in Feces of Infected Fleas
A. atropos a Potential Carrier of Malaria Organisms
Summary of Current Prevalence of Communicable Diseases

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UNITED STATES PUBLIC HEALTH SERVICE

HUGH S. CUMMING, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. R. C. WILLIAMS, *Chief of Division*

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PUBLIC HEALTH REPORTS

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TYPHUS FEVER: TYPHUS VIRUS IN FECES OF INFECTED FLEAS (*XENOPSYLLA CHEOPIS*) AND DURATION OF INFECTIVITY OF FLEAS

By E. T. CEDER, *Assistant Surgeon*, R. E. DYER, *Surgeon*, and A. RUMREICH, and L. F. BADGER, *Passed Assistant Surgeons, U. S. Public Health Service*

As a step in the elucidation of the mechanism by which the rat flea (*Xenopsylla cheopis*) transmits endemic typhus fever of the United States from rat to rat, or from rat to man, experiments have been made to determine the presence of the virus in the feces of infected fleas. As noted in a previous publication (1), the feces of fleas infected by feeding on white rats which had been inoculated with the virus of endemic typhus were found to be infectious. The experiments bearing on this point follow:

Rat fleas (*Xenopsylla cheopis*) were placed in one of the glass boxes previously used in transmission experiments (2) (3). White rats were inoculated with the virus of endemic typhus and introduced into the box which contained the fleas. After a period of two weeks a few fleas were removed, ground up in salt solution, and injected into 2 guinea pigs. The reaction typical of endemic typhus resulted in both injected animals. Approximately 50 fleas were then removed from the glass box and placed in a test tube overnight. The following morning all fleas and eggs were removed carefully from the test tube. The feces which had been deposited on the walls of the test tube were taken up in salt solution and injected into 2 guinea pigs. Both of these guinea pigs developed typical clinical endemic typhus. One of these guinea pigs was later found to be immune to a known strain of endemic typhus. The second animal was sacrificed to obtain material for inoculation of other guinea pigs. This strain was carried in animals for four generations, a total of 22 guinea pigs and 2 rabbits being used. Eighteen of these guinea pigs developed typical clinical endemic typhus, and one of these animals, from the fourth transfer generation, was tested for immunity to endemic typhus and found immune. The sera of the two rabbits developed agglutinins for *B. proteus* X_{19}, type O, the serum of one rabbit giving complete agglutination in a dilution of 1:80, while the second showed

complete agglutination at 1:160; incomplete at 1:320 and 1:640; and partial agglutination at 1:1280.

This experiment was repeated twice, the two strains established in these repetitions being known as flea feces virus X-8 and flea feces virus X-13, respectively. Both of these strains were studied carefully in guinea pigs and rabbits for several generations. A total of 51 guinea pigs and 4 rabbits (10 generations) were inoculated with strain flea feces X-8. Thirty-nine of the guinea pigs inoculated with this strain developed clinical endemic typhus, while of the 4 rabbits inoculated, 1 died, and the sera of the 3 remaining developed agglutinins for *B. proteus* X_{19}, type O, as shown in Table 1.

TABLE 1.—*Agglutination of B. proteus X_{19}, type O, by the sera of rabbits following inoculation with virus strains recovered from feces of typhus-infected fleas*

Rabbit	Flea feces X-8								
	Number of weeks after inoculation	Serum dilutions							
		10	20	40	80	160	320	640	1,280
4621A	0	2	0	0	0	0	0	0	0
	1	4	4	4	3	0	0	0	0
	2	3	4	3	1	0	0	0	0
	3	4	4	4	4	2	0	0	0
4792A	0	0	0	0	0	0	0	0	0
	1	4	4	4	4	2	0	0	0
	2	4	4	4	4	4	3	1	0
	3	4	4	4	4	3	1	0	0
4792B	0	1	0	0	0	0	0	0	0
	1	3	3	2	1	0	0	0	0
	2	4	4	4	4	2	0	0	0
	3	4	4	4	4	2	1	0	0

Rabbit	Flea feces X-13								
	Number of weeks after inoculation	Serum dilutions							
		10	20	40	80	160	320	640	1,280
4532A	0	2	0	0	0	0	0	0	0
	1	4	4	4	4	2	0	0	0
	2	4	4	4	3	2	0	0	0
	3	4	4	4	4	2	0	0	0
	4	4	4	3	0	0	0	0	0
4532B	0	3	2	0	0	0	0	0	0
	1	4	4	2	0	0	0	0	0
	2	4	4	4	4	4	3	1	0
	3	4	4	4	4	4	4	3	0
	4	4	4	4	4	4	2	0	0

Rickettsiae were found readily in smears made from the tunica vaginalis of guinea pigs injected with the flea feces X-8 strain of virus. Of three brains examined histologically, all showed the lesions characteristic of endemic typhus in the guinea pig. That a definite cross immunity existed between this strain of virus and known endemic typhus strains is shown in Charts I and II.

The strain known as flea feces X-13 was studied in guinea pigs and rabbits for nine generations, 66 guinea pigs and 2 rabbits being used. Approximately three-fourths of the guinea pigs developed clinical endemic typhus. The sera of the rabbits developed agglutinins for *B. proteus* X_{19}, type O, as shown in Table 1.

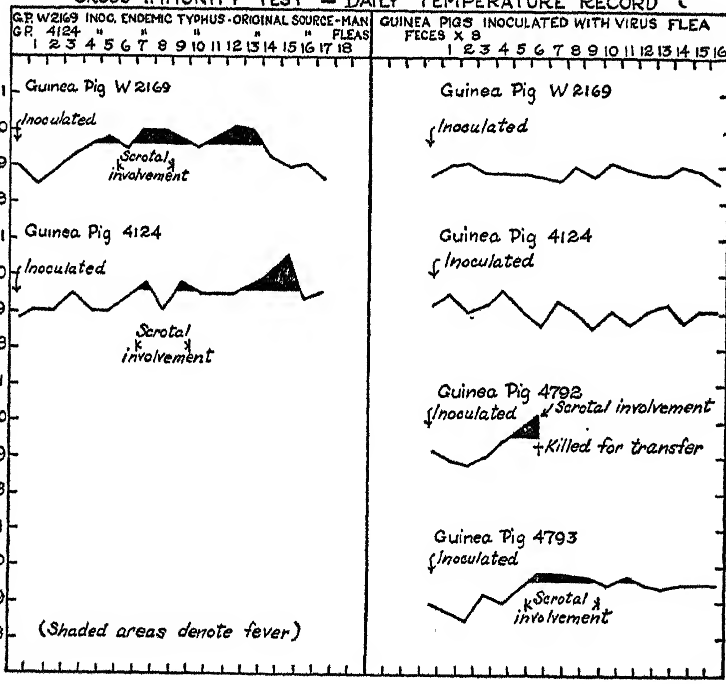
Rickettsiae were found readily in smears made from the tunica vaginalis of guinea pigs infected with this strain of virus. Brains from five guinea pigs from this strain were examined histologically and characteristic lesions of endemic typhus were found in four of them. Clear-cut cross immunity was found to exist between this strain of virus and known strains of endemic typhus virus.

Experimental work on the viability of typhus virus in infected fleas shows that the virus may remain virulent in the rat flea (*Xenopsylla cheopis*) for as long as 36 days after the last infecting feeding. It seems probable that once this species of flea becomes infected it may remain infective through life.

Attempts have been made to recover typhus virus from fleas hatched from eggs of infected fleas. In none of these attempts has

CHART I

CROSS IMMUNITY TEST — DAILY TEMPERATURE RECORD



evidence been procured that typhus virus may be transmitted by infected fleas to their offspring through the egg.

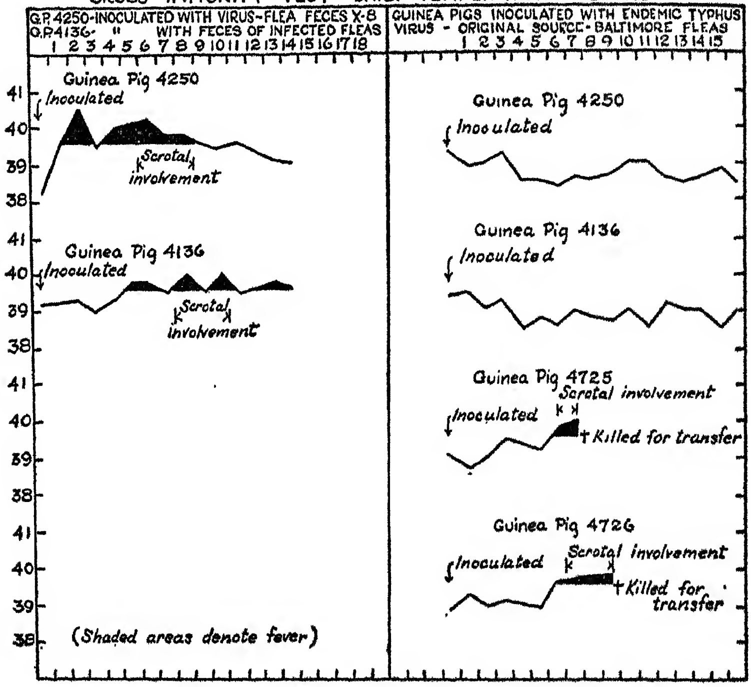
In the past few months we have attempted repeatedly to transmit typhus by feeding infected fleas on normal guinea pigs. In these experiments the fleas were confined in test tubes which were closed by stretching chiffon over the mouths of the tubes. The fleas fed readily through the chiffon but in no instance did the guinea pigs develop evidence of typhus, nor were they found later to be immune to subsequent injections of typhus virus.

In view of the negative results in our attempts to transmit typhus by direct bite of infected fleas, arranged in such a manner as to practically eliminate any part the feces might play, we tried to transmit the infection by crushing infected fleas and smearing them on the

abraded abdomen of guinea pigs. In this experiment we were successful.

Without placing too much stress on our negative results in direct feeding of infected fleas, the foregoing work suggests that a probable mechanism by which endemic typhus may be transmitted is through

CHART II
CROSS IMMUNITY TEST - DAILY TEMPERATURE RECORD



the rubbing of infected feces into wounds made by the biting of the flea or by scratching.

REFERENCES

(1) Dyer, R. E., Ceder, E. T., Rumreich, A., and Badger, L. F.: Pub. Health Rep., 46 : 2415 (Oct. 9), 1931. Reprint No. 1517.
(2) Dyer, R. E., Ceder, E. T., Rumreich, A., and Badger, L. F. : Pub. Health Rep., 46 : 1869 (Aug. 7), 1931. Reprint No. 1498.
(3) Dyer, R. E., Ceder, E. T., Lillie, R. D., Rumreich, A., and Badger, L. F.: Pub. Health Rep., 46 : 2481 (Oct. 16), 1931. Reprint No. 1520.

ANOPHELES ATROPOS D. & K.—A NEW POTENTIAL CARRIER OF MALARIA ORGANISMS

By Bruce Mayne, *Special Expert*, and T. H. D. Griffitts, *Surgeon, United States Public Health Service*

The specimens of the *Anopheles atropos* D. & K. used in the infectivity experiments described here were captured as imagoes on the three days, October 29 and 30 and November 2, 1931, in a salt marsh at Pointe aux Chenes, near Ocean Springs, Miss. It was desirable to supplement these collections with bred-out material, but we were not successful in finding a sufficient number of aquatic forms, due probably to the extreme drought prevailing at this time. Therefore, recourse was had to capturing adults which were attracted to the persons of the collectors. The collections were made by visiting small salt pools deep in the marsh and allowing the mosquitoes to attack while remaining quiet. In this manner two collectors captured approximately 50 female specimens of *Anopheles atropos*, some of which were permitted to become blood engorged. The mosquitoes were collected in glass tubes and transferred immediately to cloth cages, made after the pattern of the Barraud shipping cage. These cages are admirably suited for shipment at long distances, for they are so constructed that the live specimens of mosquitoes are kept in a humid atmosphere by means of moist cotton gauze surrounding the netted fabric protected by the galvanized wire frame.

The specimens while awaiting shipment were maintained by placing partially masticated raisins within reach of the insects. These cages were placed with a final moistening of the gauze pads in stout corrugated cardboard boxes and transported by post to Columbia, S. C. A count of the survivors yielded nearly 100 per cent, showing clearly the advantage of the netted cloth cages of the Barraud type over the metal cloth cages used for comparative purposes.

Table 1 details data in which the specimens of *atropos*, when applied to a suitable carrier of *P. vivax* gametocytes, proved infected on dissection.

Table No. 1.—*Designating atropos infections*

Serial No. of mosquito	Dates of biting carrier	Number of feedings	Date of dissection	Longest possible incubation	Results
	NOVEMBER			*Days*	
1	1, 5, 9, 11	4	Nov. 14	14	3 oöcysts, pigmented, largest 16 mu.
2	1, 3, 5	3	do	14	19 oöcysts, pigmented, 8–12 mu.
3	1, 3, 5	3	Nov. 10	10	3 oöcysts, pigmented, maximum 12 mu.
4	1	1	Nov. 7	7	1 oocyst, pigmented, 4 by 8 mu.
5	1, 4, 8, 13	4	Nov. 15	15	38 oöcysts, undifferentiated, majority pigmented, 16–35 mu.
6	1, 6, 8, 11, 15, 18.	6	Nov. 19	19	6 oöcysts, 60–64 mu; 2 of them containing sporozoites; others segmented. In addition, 10 oöcysts pigmented, in size from 20–48 mu. No sporozoites in glands.

TABLE No. 1.—*Designating atropos infections*—Continued

Serial No. of mosquito	Dates of biting carrier	Number of feedings	Date of dissection	Longest possible incubation	Results
	NOVEMBER—con.			Days	
7	2, 5, 8, 10	4	Nov. 14	12	42 oöcysts, all but 1 pigmented, 24 33 mu; average 27 mu; 1 presegmented, size 32 mu.
8	2, 5, 8	3	Nov. 9	7	60 oöcysts, pigmented, average 8 mu.
9	2, 4	2	Nov. 8	6	68 oöcysts, pigmented, average 14 mu; maximum 16 mu.
10	2, 7, 9, 11, 15, 19.	6	Nov. 23	21	2 granulated oöcysts, 20-24 mu; 1 oöcyst capsule. Scanty number of free swimming sporozoites, size 12-13.2 mu. Glands: All lobes swarming with sporozoites; typically active, average size 12 mu, a few at 15.5 mu. Staining characteristic, single and double nucleus. Fields of sporozoites in massed heavy clusters.
12	3	1	Nov. 10	7	6 oöcysts, pigmented, 8-14 mu.
13	3, 7, 9	3	Nov. 12	9	26 oöcysts, size up to 22 mu; average 16 mu.
14	3, 7, 9	3	Nov. 15	12	53 oöcysts, majority pigmented or granulated; size 16-22 mu.
15	4, 6, 8	3	Nov. 13	9	24 oöcysts, pigmented; maximum 16 mu, average, 12 mu.
16	4, 6, 8, 10, 15, 21.	6	Nov. 27	23	Gut: More than 3-400 oöcysts covering the blood engorged organ, majority segmented, 12 at least ripe, with sporozoites; many free-moving sporozoites seen. Glands: Packed with very typical sporozoites.
17	4, 7	2	Nov. 11	7	2 oöcysts, size 9 mu.
18	4	1	Nov. 10	6	3 oöcysts, size 12-16 mu.
19	4, 6, 8, 10	4	Nov. 14	10	11 oöcysts, pigmented; maximum 23 mu.
20	5, 7, 9, 12, 15, 18, 21.	7	Nov. 25	20	Gut: A few pigmented oöcysts observed, size 17.76 mu. The gut blood engorged. Glands: Negative.
21	5, 9, 11, 15	4	Nov. 18	13	Approximately 40 oöcysts, 12-28 mu, majority 20-24 mu. Pigmented and granulated.
23	5	1	Nov. 8	3	36 oöcysts, size 4-9 mu.
25	6, 9, 12, 15	4	Nov. 17	11	15 oöcysts, 12-32 mu; pigmented, larger ones granulated.
26	7, 13, 16, 18, 21.	5	Nov. 25	18	Tremendous infection; both stomach and glands containing approximately several hundred oöcysts in various stages of development, particularly mature forms packed with sporozoites; mounting fluid contained matted clusters of actively wriggling sporozoites; thousands of these were observed; thoracic muscles in the region of the glands with extreme numbers of sporozoites; glands heavily packed; size 11-15.5 mu.
27	7	1	Nov. 13	6	4 oöcysts, pigmented, 14-16 mu.
29	9, 13	2	Nov. 15	6	14 oöcysts, pigmented; average 8 mu.

Summary of Table 1, designating atropos infections

Total dissected	28
Total with oöcysts—5 days or more	24
Total negative	3
Mosquitoes with sporozoites:	
Up to 15 days	0
15–23 days—	
Gut with sporozoites	4
Gland with sporozoites	3
Percentage of infections	85.7

SUPPLEMENTARY NOTES TO TABLE NO. 1 ON MOSQUITOES FOUND WITH MATURE ORGANISMS

Specimen No. 6.—This mosquito was induced to bite a patient suffering from the effects of an infection caused by *P. vivax*, resulting from mosquito biting experimentally. Six feedings were obtained during the 19 days' incubation period. The host's blood exhibited on two

occasions as high as 75 mature gametocytes to 1,000 leucocytes counted in a thick smear.

When dissected on November 19 the gut of this mosquito was found heavily engorged with blood undigested from its last meals. There were a total of 16 oöcysts observed, 10 of them 20–48 mu in size, all containing characteristic pigment. Four oöcysts were segmented; pigment here was absent, and the two remaining forms contained sporozoites, probably only recently ripened. The latter oöcysts and the other four just mentioned measured 60–64 mu. A prolonged search failed to produce free sporozoites in the mounting fluid surrounding the gut or in the material from the macerated thorax. The salivary glands appeared quite free of sporozoites.

Specimen No. 10.—Six infective feedings, synchronous with the preceding specimen, were allowed to this mosquito. It survived an incubation period of 21 days. The gut offered as evidence of infection two granulated oöcysts of 20 and 24 microns in size, and one discharged capsule of an oöcyst. Further evidence was observed in the presence of a scanty number of undetached sporozoites. These were 12–13.2 mu and actively motile along the gut wall.

The glands of the dissected mosquito were kept under observation during a period of six hours. All of the six lobes appeared crowded to the maximum capacity with sporozoites, while the forms already liberated in the saline suspension appeared in a swarming mat of typically active organisms. Their movement was undulating, while the tapering ends were observed to curve in the form of a shepherd's crook. The majority were seen with a single nucleus, many with two nuclei. The size varied in length from 12–15.5 mu, the majority measuring 12 mu, and their width being fairly uniform at 1–1.5 mu.

The dissected material was kept at a temperature of 60° F., and there appeared no diminution of activity after six hours.

After staining with Giemsa it was observed that the sporozoites were present in great profusion. They reacted quite specifically to the Giemsa stain. The sporozoites were again measured, the majority appearing contracted in length by 1 micron. They measured 11–14 mu. A single form, apparently unchanged, measured nearly 15.5 mu. It seemed considerably distended and disintegrated.

Specimen No. 16.—This specimen of *atropos* was given an opportunity to become infected during a development of 23 days while it was induced to bite a gametocyte carrier of *P. vivax* on six occasions. This mosquito had been applied to two patients,[1] who were selected for malaria therapy, before it was killed for the purpose of examination.

On the surface of the blood-distended gut wall, on a portion suitable for inspection, there were observed 12 oöcysts of size 55.5 mu,

[1] Both of these patients showed very marked clinical symptoms of malarial fever with typical specimens of *Plasmodium vivax* in their blood following an incubation period of 13 days and 16 days, respectively.

engorged with sporozoites. Several more oöcysts, 38.4 mu in maximum size, appeared on the edge of the gut tissue in a stage of presegmentation. In addition, several oöcyst capsules with collapsed walls were noticed on the gut wall, and after clearing some of the blood from the stomach, it was apparent that the gut surface was fairly covered with oöcysts in a stage of segmentation. There were evidently more than 300 to 400 of these.

Many sporozoites were observed freely moving in the fluid along the gut wall.

The salivary glands appeared packed to the utmost with living sporozoites, showing typical form and behavior when expressed on pressure of the cover glass. They measured in length 11–15.5 mu.

Specimen No. 26.—Five infective feedings were allowed this mosquito. It died after 18 days of parasite development. Upon dissection there was obviously a tremendous invasion of organisms in all stages. The gut contained several hundred oöcysts, particularly of the mature stages. Not only were the oöcysts fairly engorged with live-looking sporozoites, but there were matted clusters of tens of thousands of actively wriggling, sickle-shaped organisms surrounding the alimentary tract in the saline dissecting fluid.

Measurements of some of these oöcysts under usual pressure of cover glass resulted as follows:

Fourteen of the undifferentiated forms appeared to attain a maximum diameter of 66 mu.

Twenty of the segmented forms measured 39.6–50.6 mu.

Twenty of the forms containing sporozoites measured 48.4–61.6 mu.

The undetached sporozoites from the gut wall measured the same size as those examined from the lobes of the salivary glands, namely, 11.10 to 15.54 mu, with an average length of 13.32 mu and a width of 1.4 mu. The glands and the tissue of the macerated thoracic material were unusually heavily infected with great numbers of motile sporozoites measuring as previously recorded.

The controls used for the *atropos* infectivity tests were a collection of anophelines of three species captured from a stable about 20 miles from Columbia. They were treated in the same manner regarding the source of infection and exposure to temperature and humidity as the specimens of *atropos* described in Table 1. These data are described in Table 2.

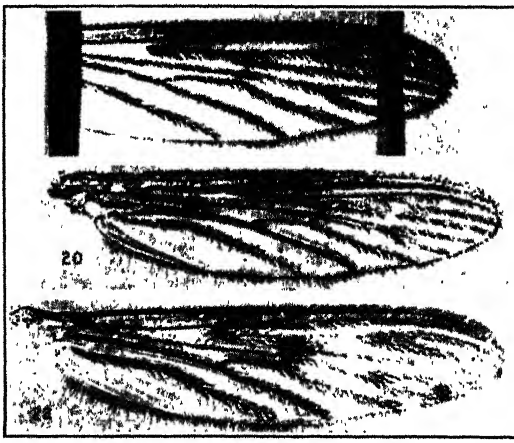


FIGURE 1. Top: Portion of wing of *Anopheles walkeri* Theob.; 20, wing of *Anopheles atropos* D. & K.; 22, wing of *Anopheles quadrimaculatus* Say. Reproduced from plates of Howard, Dyar, and Knab, Mosquitoes of North America. Carnegie Press

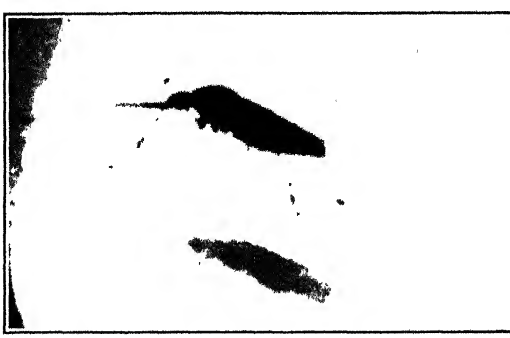


FIGURE 2. Photograph of *A. atropos* (× 4) specimen No. 16, mentioned in text, showing characteristic Culexlike attitude

FIGURE 3.—Portion of gut wall of *atropos* No. 16, showing one ripe oöcyst and ruptured oocyst capsule

TABLE No. 2.—*Designating controls: Atropos infections*

Species and serial No.	Dates of biting carrier	Number of feedings	Date dissected	Longest possible incubation—days	Results
Quad. M-2	Oct. 19, 25, 29, and Nov. 2, 5, 8, 11.	7	Nov. 13	25	Several hundreds of oöcysts in all stages up to 68 mu. Sporozoites on gut. Glands: Numerous sporozoites.
Quad. M-4	Oct. 19, 22, 25, 28	4	Oct. 31	12	Moderate number of oöcysts; none over 24 mu.
Quad. M-6	Oct. 19, 23	2	Oct. 26	7	14 pigmented oocysts, size 12 mu and under.
Punct. M-7	Oct. 19, 22, 25, 30	4	Nov. 9	20	33 oöcysts up to 65 mu, 6 with sporozoites; many sporozoites free on gut. Glands: maximum number of sporozoites.
Quad. O-2	Oct. 21, 24	2	Oct. 28	7	Several pigmented oöcysts, pigmented up to 20 mu.
Quad. O-3	Oct. 21, 24, 28	3	Oct. 30	9	22 oöcysts, pigmented and presegmented, size 16-24 mu.
Quad. O-7	Oct. 21, 25, 30, and Nov. 2, 5, 8.	6	Nov. 11	21	More than 100 (majority segmenting) oöcysts, size 48-60 mu. Many free sporozoites seen. Glands: Tremendous sporozoite infection.
Quad. O-9	Oct. 21, 24, 28, 31, and Nov. 3, 8.	6	Nov. 12	22	Specimen blood engorged at dissection, sporozoites seen along gut wall and in thorax
Quad. O-10	Oct. 21, 24, 28, and Nov. 2, 5.	5	Nov. 8	18	Oöcysts; total number 128, 3 with sporozoites; size 48-52-60 mu. Glands: Quite negative.
Punct. O-12	Oct. 21, 24, 28	3	Oct. 30	9	Moderate number of oöcysts, size 16-24 mu, pigmented.
Punct. P-3	Oct. 22	1	Oct. 29	7	11 oocysts, size 12-20 mu; average 16 mu.
Punct. P-4	Oct. 22, 25, 28	3	Oct. 31	9	Moderate number of oöcysts; maximum size 20 mu.
Quad. P-6	Oct. 22, 25, 28, and Nov. 1, 4, 8, 11, 13.	8	Nov. 16	24	Approximately 150 oöcysts, 8-68 mu; average about 40 mu. Pigmented, granulated, and segmented forms. Numerous sporozoites in media surrounding stomach. Glands packed with sporozoites. Swarms in fluid active, 12-16 mu in size.
Punct. P-7	Oct. 22	1	Oct. 23	1½	Several hundred oökinetes observed.
Punct. P-9	do	1	Oct. 24	2	A few pigmented forms, quite immature.
Punct. Q-3	Oct. 23	1	Oct. 26	3	Great numbers of pigmented zygotes, less than 8 mu.
Punct. Q-4	Oct. 23, 26, 30	3	Nov. 6	14	About 200 oöcysts pigmented, none reaching segmented stage.
Quad. Q-5	Oct. 9, 24, and Nov. 3, 6, 11, 15.	6	Nov. 17	23	Upward of 100 oocysts, 20-72 mu in size; majority 40-48 mu. Numerous sporozoites in mounting fluid. Glands packed with sporozoites, 12-16 mu. in size. Active and typical.
Punct. Q-7	Oct. 24, 28, 31	3	Nov. 3	10	8 oöcysts pigmented, 8-12 mu.
Punct. Q-8	Oct. 24, 28, 31, and Nov. 6.	4	Nov. 11	18	Approximately 125 oöcysts (100 counted) in all stages, except pigmented, up to 60 mu; majority with sporozoites. Glands: A scanty number of full-sized active sporozoites.
Punct. R-6	Oct. 30 and Nov. 2, 5, 8, 11.	5	Nov. 12	13	Approximately 125 oöcysts (54 counted); majority 22-28 mu, maximum 32 mu; presegmented stage mostly.
Punct. R-9	Oct. 30	1	Nov. 3	4	4 oöcysts, size 8-21 mu.
Punct. R-11	Oct. 30 and Nov. 2, 7, 10.	4	Nov. 13	14	About 60 oöcysts pigmented, size 5-8 mu.
Punct. R-14	Nov. 1	1	Nov. 8	8	As many as 90 oöcysts pigmented, maximum size 16 mu.
Crucians R-2	Oct. 26, 30, and Nov. 2, 5.	4	Nov. 10	15	Nearly 200 oöcysts (counted 180); majority stage of segmentation; size 60 mu. Glands: Apparently negative.

Summary of Table 2, designating controls: Atropos infections

Total dissected	38
Total with oöcysts—5 days or more	21
Total negative	13
Mosquitoes with sporozoites:	
Up to 15 days	0
15 to 25 days—	
Gut with sporozoites	1
Gland with sporozoites	7
Percentage of infections	55. 2

There are offered for comparison the results of attempting to infect specimens of *Anopheles quadrimaculatus* obtained in the same general region of the Gulf coast where the specimens of *atropos* were collected.

Six of the specimens which survived the shipment from place of origin and developed the infection after biting the tertian carrier in two to five applications are included in the following table:

TABLE NO. 3.—*Regarding infections of quadrimaculatus*

Serial No. of mosquito	Dates of biting carrier	Number of feedings	Date of dissection	Longest possible incubation	Results
				Days	
1	Sept. 5, 8, 11, 13.	4	Sept. 28	23	Gut: 9 oöcysts and 5 discharged. Size up to 48 mu granulated and segmenting. Two ripe with sporozoites. Glands: A few sluggishly active sporozoites in mounting fluid. Lobes of glands packed with normal appearing sporozoites, size 12 14 mu.
2	Sept. 5, 8, 11, 13, 15.	5	Oct. 2	27	Gut: Fairly covered with presegmenting oöcysts, size up to 64 mu; average size 45 mu. One with sporozoites. Glands: Devoid of sporozoites.
3	Sept. 5, 8, 11, 13.	4	Sept. 17	12	Gut: 8 oöcysts observed and 2 discharged forms. Glands: Moderate infection; sporozoites quite active and normal.
4	Sept. 5, 8, 12.	3	Sept. 14	9	Gut: 14 oöcysts, 4 of them segmented and sporozoites noted in 2 others. Glands: Scanty number of typical sporozoites. Normal in form, size, and motility. Size 12-14 mu.
5	Sept. 5, 9	2	Sept. 12	7	Gut: 5 oöcysts present, 24-40 mu, pigmented and granulated forms. Sporozoites absent.
7	Sept. 6, 9, 12.	3	Sept. 15	9	Gut: A total of 152 oöcysts counted, 3 of these 56-68 mu in size. No sporozoites either on gut or in glands.

Summary of Table 3

Total dissected	7
Total with oöcysts—5 days or more	6
Total negative	1
With sporozoites up to 27 days:	
Gut	4
Glands	3
Percentage of infections	85.7

A note on the biological relationships of *Anopheles atropos* is contributed as a supplement to the present experimental data.

Habitat.—In the course of a survey of salt-marsh mosquito-breeding areas of the South Atlantic and Gulf States, conducted by the United States Public Health Service, *Anopheles atropos* has been recorded in the four States of Mississippi, Louisiana, Alabama, and Florida. It is strictly a salt-water mosquito, frequently found in the same habitat as *Aëdes sollicitans*, *Ae. taeniorhynchus*, and *Anopheles crucians*.

At Pointe aux Chenes, near Ocean Springs, Miss., where specimens of adults were captured which were employed in the infectivity tests recorded in this paper, are surrounding marshes characteristic of such habitats having a firm alluvial dense root mat formation, covered with a heavy growth of salt grass (Spartina spp.). Where salt pools,

which are the favorite production areas of *atropos*, occur in these marshes, the water can scarcely be muddied, the bottom of the pools being sandy, with sides of a firm clay. When production is said to be heavy, larvae of this species inhabit every square foot of water surface.

The preferential breeding place of *A. atropos* is characterized by the junior author as shallow water on muck or alluvial marshes, or in permanent salt pools whose water has a salinity (salinometer with direct salinity reading) of from 3 per cent to 21 per cent.

Host relations.—*Atropos* have been observed in great numbers n occupied rooms in hotels and private homes within flight distance of the production areas. The junior author has personally collected these mosquitoes at such places at Buras, La., and at Biloxi, Miss.

Biting habits.—Close to its breeding place in marsh areas *atropos* is known to attack in direct sunlight as well as by night. It is then a greater torment as a pest than the redoubtable *Aëdes sollicitans*, which shares its intrepidity in persisting in its attacks so that one may easily collect it when attached to its host by dislodging it with thumb and finger.

The culexlike attitude of atropos.—*Atropos* is distinguished at once from the common species of anophelines of America by its decided culexlike appearance, especially when attacking or resting after blood engorgement. This is further emphasized by its unorthodox nonanopheline wing, which is clear in the bright sunlight. When observed biting in the direct sunshine, this species assumes the 2-plane angle which does not characterize the common anophelines, namely, *quadrimaculatus*, *punctipennis*, or *crucians*. *Anopheles atropos* is observed to typify less the "standing-on-head" position while biting and often appears "sprawled" when about ready to finish the blood meal. The brown color of the mesonotum, as well as its near *Culex* position, makes this species often mistaken by the unwary for a *Culex*, especially because of its resemblance to *Culex salinarius*.

Morphological characters.—*Anopheles atropos* [2] is described by the taxonomist as a rather small blackish *Anopheles* with unspotted wings. Its wing scales are entirely dark, not forming spots. Its mesonotum

[2] The specimens of mosquitoes employed in our experiments were provisionally identified when collected alive and studied while biting and resting. The authors agreed to the specific identification of these specimens as *A. atropos* D. & K. Following the dissection of the stomach and salivary glands, all of the parts that were possible to salvage namely, wings, legs, abdominal integument, thoracic exoskeleton, and head with mouth parts, were meticulously assembled, placed in gelatine capsules, and submitted to Dr. Harold Morrison, Chief of the Taxonomic Division of the U. S. Bureau of Entomology. He, with the assistance of Dr. Alan Stone, dipterist of the U. S. National Museum, courteously consented to attempt to identify the species of the several mosquito remnants submitted. Their report is as follows: Only one of the specimens, namely, No. 14, was found impossible to examine. The remainder were regarded indeterminately, either *Anopheles atropos* Dyar and Knab, or *Anopheles walkeri* Theobald. "*Anopheles atropos* D. & K. can not be distinguished from *A. walkeri* Theob. in the female. It is difficult to distinguish them from *quadrimaculatus* Say. *Atropos* breeds in salt water, *walkeri* in fresh, and both occur in the South. Only a study of the male genitalia will separate these and there is some question as to their specific distinction."

is elongate and deep brown; abdomen blackish in the integument, with dark hairs; legs and palpi entirely dark, the latter with traces of paler markings at the articulations.

Color.—Recently emerged imagoes are very dark, almost a bluish black. Older specimens appear brownish or even remarkably reddish on the mesonotum.

The species of anophelines discussed in this paper can be distinguished in life from its nearest relatives, *Anopheles quadrimaculatus* Say, and *A. walkeri* Theob., but some confusion arises when identification is required of a specimen preserved for the museum. The following parallel, from a description of the females taken from Dyar's Mosquitoes of the Americas (1928), is offered in identifying the two more closely related species, *A. atropos* and *A. walkeri:*

Atropos (female)	*Walkeri* (female)
Proboscis: straight, black.	Slightly curved, black.
Palpi: black, small faint white rings, bases of joints.	Rather slender, black, yellowish rings at tips of all joints.
Occiput: black, erect forked scales and long bristles, all black.	Black, whitish spot on each side, scales erect, forked, black.
Mesonotum: black, brownish or black hairs; pleurae black.	Dark brown, more or less streaked with whitish; pleurae brown and grayish.
Abdomen: blackish, with brown-black hairs.	Black, with yellowish-brown hairs.
Legs: brown black, without spottings.	Black, with bronzy reflections, femora and tibiae yellowish white at tips.
Wings: scales black, without spots.	Scales black, not or faintly forming spots at bases of second to fourth veins and forks of second and fourth.

Temperature and humidity.—During the 25 days of the experimental investigation the specimens of *Anopheles atropos* and the controls were maintained at a relatively low temperature of 68° to 70° F. during the months of October and November. The relative humidity registered a high mean percentage of 80 to 90.

The conditions maintained for the specimens detailed in Table 3 were a decidedly higher temperature up to the development of sporozoites. The temperature here went to a maximum of 82° F. during the latter part of September and in October, and may account for the great acceleration of the appearance of gland sporozoites, namely, a minimum of nine days. In the other controls of the same species and the same parasite, *P. vivax* sporozoites did not appear before 18 days.

Conclusions.—*Anopheles atropos* D. & K. is presented as a new potential carrier of *Plasmodium vivax.* In infectivity tests it proved equal in efficiency to *Anopheles quadrimaculatus, A. crucians,* and *A. punctipennis* used as controls under similar or more favorable conditions.

Acknowledgments

The work of attempted infectivity was conducted at the South Carolina State Hospital, where, through the courtesy of the superintendent, Dr. C. F. Williams, and the medical director, Dr. E. L. Horger, and the other authorities of the State institution, suitable patients were provided for the use of the Government investigators. Mention should be made of the services of Mr. Hans E. Hingst, senior medical technician, who was indefatigable beyond the call of duty in contributing, largely by his skillful dissections, to the success of the experimental procedure.

CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES [1]

November 8–December 5, 1931

The prevalence of certain important communicable diseases, as indicated by weekly telegraphic reports from State health departments to the Public Health Service, is summarized in this report. The underlying statistical data are published weekly in the Public Health Reports under the section entitled "Prevalence of Disease."

Poliomyelitis.—Further recovery from the recent epidemic of poliomyelitis continued through the month of November. For the current 4-week period the number of reported cases was only about 72 per cent of the number reported for the same period last year. The number was, however, more than three times the number of cases recorded for the corresponding period in 1929.

In the New England and Middle Atlantic States, where the epidemic first appeared, the number of cases for the current period was still almost double the number of cases reported for the same period last year. The South Atlantic States compared very favorably with last year and in other regions the decreases in the incidence of the disease ranged from 50 per cent in the West North Central States to 80 per cent in the Mountain and Pacific groups. In the latter group, this period last year marked the first appreciable decrease in the outbreak of poliomyelitis which had begun there earlier in the season. A comparison of this group with 1929, a more nearly normal year, shows that the incidence of the disease during the current period was about 15 per cent in excess of its incidence during the same period in that year.

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[1] From the Office of Statistical Investigations, U. S. Public Health Service. The number of States included for the various diseases are as follows: Typhoid fever, 47; poliomyelitis, 48; meningococcus meningitis, 48; smallpox, 48; measles, 45; diphtheria, 47; scarlet fever, 47; influenza, 39 States and New York City. The District of Columbia is counted as a State in these reports.

The total number of cases of poliomyelitis reported for the current 4-week period was 625, approximately 1,200 less than were reported for the preceding 4-week period.

Diphtheria.—The total reported incidence of diphtheria (9,357 cases) for the current period was about 33 per cent higher than that of last year for the same period. All areas contributed to the increase except the New England and Middle Atlantic and East North Central. In the former group a slight decrease (6 per cent) was shown and in the latter group the figure for the current period equaled that of last year. The increases in the various groups ranged from 40 per cent in the Far West groups to 90 per cent in the West North Central group.

For the country as a whole the number of cases reported for the current period was approximately 500 less than was reported for the preceding 4-week period which might indicate that the peak for this year was passed during that period (October 11 to November 7). In each of the two preceding years the peak was reached during the period corresponding to the current 4-week period. For this period in 1930 the reported cases totaled 7,031, and in 1929, 9,405 cases were reported.

Measles.—The usual seasonal increase of measles continued through the current 4-week period. The number of cases (8,805) was about 15 per cent in excess of the number reported for the same period in 1930, but was 10 per cent lower than in 1929. The disease was most prevalent in States along the Atlantic coast, the number of cases being much larger than was reported in either of the two preceding years.

In the New England and Middle Atlantic group the number of cases reported during the current period was 4,993, as compared with 2,900 for the same period last year and 2,711 in 1929. The South Atlantic group reported 980 cases, as compared with 218 in 1930 and 212 in 1929. All other areas showed decreases this year, ranging from 75 per cent in the far west groups to 40 per cent in the Great Lakes region. In 1929 the disease was unusually prevalent in some of these areas, especially the East North Central.

Scarlet fever.—Although the usual seasonal increase in scarlet fever was apparent in all sections of the country, the number of cases (15,281) reported for the current 4-week period came closer to the average for previous years than at any time during the current year. States in the North Central groups showed decreases from last year's figure, but in other areas the increases ranged from 11 per cent to 22 per cent.

Smallpox.—The incidence of smallpox maintained the low level which has prevailed throughout the current year. The reported cases for the current 4-week period numbered 1,124, i. e., about 77 per

cent of the cases recorded for the corresponding period last year and considerably less than one-half of the number in 1929.

Areas showing increases over last year were the New England and Middle Atlantic, West North Central, and South Central. In the New England and Middle Atlantic States the disease continued unusually prevalent in Vermont, and during the week ended December 5 there were 39 cases reported in the State of Connecticut. No cases had been reported from Connecticut since 1929. Out of 449 cases reported during the current period from the West North Central group, Iowa reported 249, as compared with 41 in the same period last year. While the number of cases was not high in the South Central States, it represented a 50 per cent increase over the same period last year.

Meningococcus meningitis.—In relation to previous years the incidence of meningococcus meningitis continued considerably below the level of either of the two preceding years for the period involved. The number of cases reported for the four weeks ended December 5 was 279, as compared with 319 cases for the same period last year and 482 cases in 1929. Each geographic area shared in this favorable decrease except the South Atlantic, where, since almost the beginning of the current year, the incidence has been slightly higher than in either 1930 or 1929.

Typhoid fever.—The incidence of typhoid fever continued to decrease during the 4-week period ended December 5. Compared with previous years the incidence (1,967 cases) was about 12 per cent less than that of last year for the same period but was more than 30 per cent in excess of the incidence in 1929. All areas showed considerable decreases in the numbers of cases occurring during the current period as compared with the preceding 4-week period.

Influenza.—The total number of cases (2,593) reported for the 4-week period ended December 5 was about 65 per cent of the number reported for the same period last year and 50 per cent of the number in 1929. All areas shared in this favorable situation except the West North Central. In that group of States 460 cases were reported as compared with 39 for the same period last year and 65 in 1929. Missouri reported 340 of the 460 cases.

Mortality, all causes.—The mortality from all causes in a group of large cities as summarized by the Bureau of the Census was the lowest in six years, viz., 11.1 per thousand population, annual basis.

COURT DECISION RELATING TO PUBLIC HEALTH

Ordinance relative to closing of barber shops held invalid.—(Mississippi Supreme Court; Knight, Chief of Police, *v.* Johns, 137 So. 509; decided Nov. 2, 1931.) By the terms of an ordinance of the city of

Clarksdale it was made unlawful and punishable by fine and imprisonment "for any barber shop in the said city to open for business before 7.30 in the forenoon and/or to remain open for business after the hour of 6.30 in the afternoon, except that, on week days which immediately precede a holiday, said barber shops may remain open for business until 9 o'clock p. m." The ordinance empowered the city health officer to inspect barber shops, and in one section it was declared that the purpose in prescribing the hours of opening and closing was "to promote the general health and sanitary conditions of the said shops, it being apparent that a better inspection may be had and made between the hours prescribed than at any other time."

The appellee, who owned and operated a barber shop in the city, twice violated the ordinance by keeping his shop open after 6.30 p. m. and was twice arrested. He then secured an injunction restraining the chief of police from further arresting him for violating the ordinance. On appeal, one of the reasons assigned for the validity of the ordinance was that it was designed to fix a reasonable time within which the city inspectors could inspect barber shops in order to ascertain whether the city's sanitary and health ordinances were being obeyed. In holding that the ordinance could not be sustained on this ground, the supreme court said:

The city has the right of inspection reasonably necessary for the enforcement of its health and sanitary ordinances. As we understand the argument, the necessity for the barber-shop-closing ordinance arises because of inconvenience to the city's inspectors of inspecting such shops during the hours the ordinance requires them to be closed. It does not, and could hardly be made to, appear that such inspection must be continuous, covering every hour a barber shop is open; and to compel the closing of barber shops between certain hours, because it will be inconvenient for the city to then inspect them, when they are open at other hours amply sufficient for such inspection, would unnecessarily and unreasonably interfere with the operation thereof.

DEATHS DURING WEEK ENDED DECEMBER 5, 1931

Summary of information received by telegraph from industrial insurance companies for the week ended December 5, 1931, and corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Dec. 5, 1931	Corresponding week, 1930
Policies in force	74, 178, 223	75, 098, 994
Number of death claims	12, 885	13, 993
Death claims per 1,000 policies in force, annual rate	9. 1	9. 7
Death claims per 1,000 policies, first 49 weeks of year, annual rate	9. 6	9. 5

Deaths [1] from all causes in certain large cities of the United States during the week ended December 5, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates furnished in this summary are based upon mid-year population estimates derived from the 1930 census.]

City	Week ended Dec. 5, 1931				Corresponding week, 1930		Death rate [2] for the first 49 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Total (82 cities)	7,404	10.8	550	[4] 44	11.8	731	11.8	11.9
Akron	32	6.3	2	20	2.9	3	7.5	7.7
Albany [5]	42	17.0	3	60	13.9	1	14.0	14.8
Atlanta [6]	65	12.2	2	20	13.4	8	15.0	15.3
White	29	8.2	0	0	8.9	5	11.6	11.4
Colored	36	20.1	2	58	22.4	3	21.7	23.0
Baltimore [5] [6]	189	12.1	19	66	15.7	25	14.2	14.0
White	156	12.2	15	67	14.4	15	12.9	12.7
Colored	33	11.7	4	64	21.8	10	19.9	19.9
Birmingham [6]	68	13.2	4	40	15.5	12	13.1	13.6
White	32	10.0	2	34	11.6	3	10.1	10.1
Colored	36	18.3	2	49	21.9	9	18.1	19.3
Boston	266	13.7	9	26	11.7	26	14.1	14.1
Bridgeport	37	13.1	2	34	12.8	5	11.1	10.9
Buffalo	117	10.5	12	54	12.9	22	12.8	12.9
Cambridge	21	9.6	3	62	11.5	1	12.0	11.8
Camden	31	13.6	2	35	11.0	0	14.1	13.4
Canton	14	6.8	1	25	9.9	1	10.0	9.9
Chicago [5]	590	8.9	48	43	11.4	67	10.5	10.4
Cincinnati	128	14.6	7	42	16.0	9	15.7	15.6
Cleveland	168	9.6	17	50	10.6	9	11.1	11.1
Columbus	63	12.0	3	29	12.9	6	13.5	15.3
Dallas [6]	64	12.2	9	--------	10.7	8	11.1	11.4
White	48	11.1	8	--------	9.6	6	9.8	10.5
Colored	16	17.6	1	--------	16.2	2	17.4	16.2
Dayton	47	10.6	6	85	11.8	3	10.5	9.6
Denver	82	14.7	9	91	12.5	7	13.8	14.9
Des Moines	25	9.0	2	38	10.2	0	10.9	11.6
Detroit	222	7.0	21	38	8.5	37	8.1	9.2
Duluth	24	12.3	3	81	14.4	2	11.3	11.5
El Paso	20	9.9	4	--------	17.7	4	15.1	17.0
Erie	32	14.2	3	62	5.4	2	10.3	11.0
Fall River [5] [7]	27	12.2	1	24	10.0	2	11.1	11.6
Flint	15	4.8	2	25	7.6	4	6.8	9.0
Fort Worth [6]	36	11.2	3	--------	14.3	3	10.5	10.9
White	31	11.5	3	--------	14.0	3	10.2	10.3
Colored	5	9.6	0	--------	15.8	0	12.3	13.5
Grand Rapids	14	4.3	1	15	10.5	3	9.0	10.1
Houston [6]	73	12.3	8	--------	13.4	10	11.0	12.1
White	45	10.3	4	--------	12.0	5	10.2	10.8
Colored	28	17.6	4	--------	17.3	5	13.5	15.9
Indianapolis [6]	88	12.4	5	38	14.3	6	13.6	14.4
White	72	11.6	3	26	13.5	6	13.1	13.5
Colored	16	18.5	2	123	20.0	0	17.1	21.3
Jersey City	59	9.6	8	71	11.0	9	11.2	11.3
Kansas City, Kans. [6]	28	11.9	1	22	11.5	0	12.6	11.7
White	24	12.6	1	27	11.6	0	11.9	11.0
Colored	4	8.9	0	0	11.4	0	15.5	14.9
Kansas City, Mo	88	11.2	8	64	12.6	4	12.9	13.2
Knoxville [6]	31	14.8	4	87	7.8	2	12.5	13.5
White	27	15.4	4	98	5.3	2	11.7	12.5
Colored	4	11.7	0	0	21.1	0	16.3	18.3
Long Beach	25	8.6	0	0	12.0	4	9.8	10.0
Los Angeles	263	10.4	7	20	11.4	24	10.6	11.0
Louisville [6]	63	10.7	5	45	14.9	12	13.7	13.5
White	45	9.0	3	31	13.4	11	12.3	12.1
Colored	18	19.7	2	143	23.1	1	21.4	21.6
Lowell [7]	31	16.1	1	26	10.4	3	12.8	13.3
Lynn	21	10.7	2	58	10.2	3	9.4	10.3
Memphis [6]	70	14.1	3	32	15.2	6	16.4	16.9
White	34	11.1	1	17	12.3	1	13.4	13.2
Colored	36	19.0	2	58	19.9	5	21.3	22.8
Miami [6]	20	9.3	0	0	13.2	4	11.6	10.9
White	16	9.6	0	0	12.8	4	10.7	9.7
Colored	4	8.2	0	0	14.5	0	14.6	15.8

See footnotes at end of table.

Deaths [1] *from all causes in certain large cities of the United States during the week ended December 5, 1931, infant mortality, annual death rate, and comparison with corresponding week of 1930. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)*—Continued

City	Week ended Dec. 5, 1931				Corresponding week, 1930		Death rate [2] for the first 49 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1931	1930
Milwaukee	91	8.0	5	22	12.2	13	9.1	9.6
Minneapolis	74	8.1	8	51	11.4	10	10.9	10.7
Nashville [6]	41	13.7	3	45	14.5	3	16.7	16.5
White	21	9.7	1	20	8.9	3	14.3	13.9
Colored	20	24.4	2	126	20.2	0	22.9	23.2
New Bedford [7]	25	11.6	1	26	12.0	3	12.1	11.0
New Haven	44	14.1	3	46	6.1	2	12.5	12.6
New Orleans [6]	122	13.6	15	84	17.2	20	16.6	17.3
White	72	11.3	8	68	14.0	14	13.5	14.3
Colored	50	19.4	7	116	25.3	6	24.1	24.9
New York	1,306	9.6	89	38	10.7	134	11.0	10.7
Bronx Borough	185	7.3	9	26	7.3	12	8.1	7.8
Brooklyn Borough	445	8.8	32	34	10.0	49	10.1	9.8
Manhattan Borough	495	14.2	39	52	15.6	55	16.5	15.9
Queens Borough	145	6.6	5	20	8.1	17	7.1	7.0
Richmond Borough	36	11.5	4	76	9.2	1	13.5	13.8
Newark, N. J	103	12.1	14	74	12.5	8	11.5	12.0
Oakland	78	13.9	2	25	11.5	1	10.7	11.0
Oklahoma City	41	10.9	5	70	15.8	8	10.6	10.9
Omaha	70	16.8	7	81	9.7	6	13.8	13.5
Paterson	31	11.6	3	51	13.5	1	13.2	12.1
Peoria	20	9.6	1	26	10.9	4	12.4	12.2
Philadelphia	477	12.6	36	52	13.7	55	12.9	12.6
Pittsburgh	163	12.6	13	45	13.6	12	14.3	13.8
Portland, Oreg	74	12.6	1	12	10.5	4	11.6	12.1
Providence	53	10.8	4	37	12.6	1	12.6	12.8
Richmond [6]	41	11.6	7	102	17.6	3	15.3	14.8
White	17	6.7	3	66	17.2	2	12.9	12.2
Colored	24	23.7	4	173	18.7	1	21.4	21.3
Rochester	64	10.1	4	37	8.6	3	11.7	11.5
St. Louis	191	12.0	12	43	12.9	10	14.8	14.0
St. Paul	64	12.1	7	72	10.0	1	10.4	10.1
Salt Lake City [5]	31	11.3	2	30	14.1	5	12.0	12.5
San Antonio	72	15.6	8	------	15.2	10	14.1	15.8
San Diego	57	19.0	0	0	16.7	3	13.6	14.5
San Francisco	163	13.1	7	47	12.1	1	12.9	13.0
Schenectady	27	14.6	0	0	9.3	1	10.8	11.1
Seattle	91	12.8	0	0	10.8	3	11.3	10.8
Somerville	17	8.4	1	31	8.0	2	8.7	9.6
South Bend	14	6.8	2	52	9.9	2	8.0	9.0
Spokane	26	11.7	2	52	14.9	3	12.4	12.5
Springfield, Mass	23	7.9	0	0	11.1	2	11.4	12.0
Syracuse	41	10.0	5	61	11.9	4	11.5	11.6
Tacoma	33	16.0	0	0	7.8	1	12.3	12.4
Toledo	71	12.5	8	75	14.5	7	11.8	12.6
Trenton	36	15.2	2	37	24.5	4	16.2	16.6
Utica	23	11.7	0	0	8.7	2	14.2	14.6
Washington, D. C. [6]	156	16.6	20	111	15.0	13	15.9	15.2
White	85	12.4	5	41	13.4	9	13.6	13.1
Colored	71	27.4	15	256	19.2	4	22.1	20.8
Waterbury	16	8.3	3	75	12.5	1	9.6	9.5
Wilmington, Del. [7]	15	7.3	0	0	11.7	2	13.7	14.4
Worcester	39	10.3	4	57	10.9	3	12.0	12.6
Yonkers	10	3.8	0	0	4.6	1	8.3	8.1
Youngstown	26	7.8	2	28	9.2	2	9.9	10.3

[1] Deaths of nonresidents are included. Stillbirths are excluded.

[2] These rates represent annual rates per 1,000 population, as estimated for 1931 and 1930 by the arithmetical method.

[3] Deaths under 1 year of age per 1,000 live births. Cities left blank are not in the registration area for births.

[4] Data for 77 cities.

[5] Deaths for week ended Friday.

[6] For the cities for which deaths are shown by color, the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 28; Nashville, 28; New Orleans, 29; Richmond, 29; and Washington, D. C., 27.

[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended December 12, 1931, and December 13, 1930

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 12, 1931, and December 13, 1930

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930
New England States:								
Maine	7	4		1	264	24	0	0
New Hampshire	7	2			5		0	0
Vermont	1	5			87	11	0	0
Massachusetts	66	93	5	9	180	232	2	2
Rhode Island	7	16	3		338	2	0	0
Connecticut	5	17	3	1	53	105	1	3
Middle Atlantic States:								
New York	124	97	[1] 11	[1] 13	401	209	8	17
New Jersey	44	70	11	16	34	118	6	2
Pennsylvania	120	138			625	381	10	3
East North Central States:								
Ohio	118	98	22	25	124	57	2	5
Indiana	72	71	22	2	30	119	6	4
Illinois	161	179	73	29	34	253	5	11
Michigan	52	81	11	1	87	89	4	7
Wisconsin	23	17	19	21	57	206	1	3
West North Central States:								
Minnesota	26	15	1		11	11	0	1
Iowa	21	7			2	5	1	0
Missouri	90	53	7	9	5	554	1	10
North Dakota	30	5			16	5	0	0
South Dakota	8	5			125	2	0	2
Nebraska	17	15			22	1	0	2
Kansas	73	34			24	2	1	2
South Atlantic States:								
Delaware	14	3		2	2		0	0
Maryland [2]	70	40	16	22	6	8	0	1
District of Columbia [3]	15	19	2		2	3	1	0
Virginia							1	
West Virginia	53	27	5	32	286	12	1	2
North Carolina [3]	87	89	32	26	19	44	3	3
South Carolina	13	29	406	625	13		0	4
Georgia [3]	32	52	67	88	2	37	1	1
Florida [3]	16	15	2		2	12	1	0

[1] New York City only.
[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 1 case in District of Columbia, 1 case in North Carolina, 2 cases in Georgia, 3 cases in Florida, and 1 case in Alabama.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 12, 1931, and December 13, 1930—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930
East South Central States:								
Kentucky	94	17	------	------	------	------	4	1
Tennessee	66	29	37	60	8	51	3	3
Alabama [3]	84	82	21	52	18	148	3	6
Mississippi	51	29	------	------	------	------	0	1
West South Central States:								
Arkansas	30	12	11	29	13	2	1	0
Louisiana	37	38	27	5	------	3	0	5
Oklahoma [4]	97	59	47	45	1	30	0	0
Texas	266	56	14	53	3	54	2	0
Mountain States:								
Montana	1	2	1	------	177	------	0	0
Idaho	1	------	------	------	------	5	0	2
Wyoming	7	1	------	6	1	------	0	1
Colorado	2	11	------	------	3	49	1	3
New Mexico	14	9	------	------	3	38	0	0
Arizona	14	4	7	5	4	59	2	3
Utah [2]	2	2	3	8	4	1	1	2
Pacific States:								
Washington	5	12	------	------	57	22	1	2
Oregon	1	10	18	17	12	29	0	2
California	81	56	105	50	146	221	8	5

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930
New England States:								
Maine	0	2	44	15	0	0	3	4
New Hampshire	0	0	15	2	0	0	0	0
Vermont	2	0	8	7	7	0	0	1
Massachusetts	7	6	300	236	0	0	3	9
Rhode Island	1	0	18	33	0	0	0	0
Connecticut	4	0	48	59	15	0	1	5
Middle Atlantic States:								
New York	11	4	432	511	40	9	25	26
New Jersey	3	0	111	182	0	0	4	2
Pennsylvania	7	1	414	451	1	0	26	34
East North Central States:								
Ohio	2	11	516	547	13	53	19	23
Indiana	1	1	143	189	8	71	12	4
Illinois	13	5	367	388	19	36	19	27
Michigan	3	3	188	228	14	34	5	13
Wisconsin	5	2	80	121	10	18	1	3
West North Central States:								
Minnesota	8	2	40	71	6	11	1	1
Iowa	3	4	47	53	41	14	1	1
Missouri	2	0	74	93	6	5	4	4
North Dakota	0	0	22	25	2	5	1	1
South Dakota	0	4	16	11	10	12	1	1
Nebraska	0	3	27	38	6	7	2	1
Kansas	1	3	68	51	5	25	3	2
South Atlantic States:								
Delaware	0	0	7	22	0	0	1	0
Maryland [2]	1	0	109	76	0	0	6	9
District of Columbia [3]	0	0	21	29	0	0	1	0
Virginia	------	------	------	------	------	------	------	------
West Virginia	0	0	46	57	4	23	21	15
North Carolina [3]	0	1	85	82	0	1	6	3
South Carolina	0	0	15	20	0	0	9	24
Georgia [3]	1	0	35	49	2	0	14	9
Florida [3]	0	0	9	5	2	1	3	0

[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 1 case in District of Columbia, 1 case in North Carolina, 2 cases in Georgia, 3 cases in Florida, and 1 case in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended December 12, 1931, and December 13, 1930—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930	Week ended Dec. 12, 1931	Week ended Dec. 13, 1930
East South Central States:								
Kentucky	2	0	78	25	0	8	16	1
Tennessee	0	1	53	51	3	2	14	3
Alabama [3]	8	0	60	86	0	0	28	22
Mississippi	0	0	24	33	4	1	6	10
West South Central States:								
Arkansas	0	2	23	17	7	0	14	16
Louisiana	0	0	22	24	3	14	33	20
Oklahoma [4]	3	2	38	34	2	21	11	9
Texas	0	3	71	47	7	16	20	6
Mountain States:								
Montana	3	0	47	42	1	14	0	2
Idaho	0	0	5	1	0	1	0	0
Wyoming	0	0	11	21	0	0	0	1
Colorado	0	2	40	62	0	4	2	1
New Mexico	0	1	9	11	0	2	9	16
Arizona	0	0	5	5	0	0	0	4
Utah [2]	0	0	12	6	0	0	0	0
Pacific States:								
Washington	3	1	66	45	15	25	7	5
Oregon	0	1	18	22	6	19	6	4
California	3	15	163	99	5	46	10	4

[2] Week ended Friday.
[3] Typhus fever, 1931, 8 cases: 1 case in District of Columbia, 1 case in North Carolina, 2 cases in Georgia, 3 cases in Florida, and 1 case in Alabama.
[4] Figures for 1931 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October, 1931										
Kansas	5	217	4	2	59		2	275	11	45
November, 1931										
District of Columbia	2	60	2		9		0	92	0	14
Iowa	7	83			13		37	201	258	16
Maine	2	17	4		782		13	139	0	16
Massachusetts	12	243	19	4	390	5	56	906	0	15
Nebraska		93	16		42		4	108	29	5
New Hampshire		21					2	23		1
Vermont		30			141		8	58	75	0
Wyoming					6		0	81	2	1

October, 1931

Kansas:	Cases
Actinomycosis	1
Chicken pox	175
German measles	4
Impetigo contagiosa	22
Mumps	88
Ptomaine poisoning	1
Scabies	23
Septic sore throat	4
Tetanus	1
Trench mouth	1
Tularæmia	1
Undulant fever	2
Vincent's angina	10
Whooping cough	62

November, 1931

	Cases
Anthrax:	
Massachusetts	1
Nebraska	1
Chicken pox:	
District of Columbia	22
Iowa	363
Maine	193
Massachusetts	488
Nebraska	165
Vermont	253
Wyoming	31
Conjunctivitis:	
Maine	2
Dysentery:	
Iowa	1
Massachusetts	5
German measles:	
Iowa	6
Massachusetts	66
Impetigo contagiosa:	
Iowa	3
Lead poisoning:	
Massachusetts	6
Lethargic encephalitis:	
Massachusetts	3
Mumps:	
Iowa	14
Maine	10
Massachusetts	627
Nebraska	43
Vermont	53
Wyoming	20
Ophthalmia neonatorum:	
Massachusetts	96
Rabies in animals:	
Vermont	1
Septic sore throat:	
Iowa	1
Maine	2
Massachusetts	21
Tetanus:	
Maine	1
Trachoma:	
Massachusetts	5
Trichinosis:	
Massachusetts	2
Undulant fever:	
Iowa	7
Massachusetts	8
Vermont	1
Vincent's angina:	
Iowa	8
Maine	4
Whooping cough:	
District of Columbia	67
Iowa	111
Maine	80
Massachusetts	474
Nebraska	52
Vermont	277
Wyoming	18

ADMISSIONS TO HOSPITALS FOR THE INSANE, AUGUST, 1929

Reports for the month of August, 1929, showing new admissions to hospitals for the care and treatment of the insane, were received by the Public Health Service from 115 hospitals, located in 39 States, the District of Columbia, and the Territory of Hawaii. The 115 hospitals had 180,155 patients on August 31, 1929—95,488 males and 84,667 females, 113 males per 100 females.

The following table shows the number of new admissions for the month of August, 1929, by psychoses:

Psychoses	Number of first admissions		
	Male	Female	Total
1. Traumatic psychoses	17	2	19
2. Senile psychoses	165	145	310
3. Psychoses with cerebral arteriosclerosis	186	127	313
4. General paralysis	236	75	311
5. Psychoses with cerebral syphilis	22	10	32
6. Psychoses with Huntington's chorea	1	2	3
7. Psychoses with brain tumor	1	1	2
8. Psychoses with other brain or nervous disease	27	11	38
9. Alcoholic psychoses	125	12	137
10. Psychoses due to drugs and other exogenous toxins	16	9	25
11. Psychoses with pellagra	12	24	36
12. Psychoses with other somatic diseases	43	55	98
13. Manic-depressive psychoses	174	243	417
14. Involution melancholia	18	48	66
15. Dementia præcox (schizophrenia)	310	286	596
16. Paranoia and paranoid conditions	28	30	58
17. Epileptic psychoses	42	29	71
18. Psychoneuroses and neuroses	22	52	74
19. Psychoses with psychopathic personality	23	9	32
20. Psychoses with mental deficiency	63	63	126
21. Undiagnosed psychoses	164	103	267
22. Without psychosis	184	46	230
Total	1,879	1,382	3,261

During the month of August, 1929, there were 3,261 new admissions to the hospitals, 57.6 per cent of these being males and 42.4 per cent females—136 males per 100 females. Four hundred and ninety-seven of the new admissions were reported as undiagnosed or "without psychosis." There were 2,764 new admissions for whom a provisional diagnosis was made. Of these 2,764 patients, cases of dementia præcox constituted 21.6 per cent; manic-depressive psychoses, 15.1 per cent; psychoses with cerebral arteriosclerosis, 11.3 per cent; general paralysis, 11.3 per cent; and senile psychoses, 11.2 per cent. These five classes accounted for 70.4 per cent of the new admissions for which a diagnosis was given.

The following table shows the number of patients in the hospitals and on parole on August 31, 1929:

	Total patients on books		
	Male	Female	Total
Total patients on books last day of month:			
In hospitals	85,443	76,644	162,087
On parole or otherwise absent, but still on books	10,045	8,023	18,068
Total	95,488	84,667	180,155

Of the 180,155 patients, 10,045 males and 8,023 females were on parole or otherwise absent but still on the books at the end of the month—10.5 per cent of the males, 9.5 per cent of the females, and 10.0 per cent of the total number of patients.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 96 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 33,360,000. The estimated population of the 89 cities reporting deaths is more than 31,815,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended December 5, 1931, and December 6, 1930

	1931	1930	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	2,288	1,666	
96 cities	643	560	1,016
Measles:			
45 States	2,796	2,896	
96 cities	721	894	
Meningococcus meningitis:			
46 States	81	105	
96 cities	41	37	
Poliomyelitis:			
46 States	94	108	
Scarlet fever:			
46 States	3,766	3,889	
96 cities	1,145	1,270	1,083
Smallpox:			
46 States	316	616	
96 cities	33	44	23
Typhoid fever:			
46 States	416	407	
96 cities	47	63	41
Deaths reported			
Influenza and pneumonia:			
89 cities	585	650	
Smallpox:			
89 cities	0	0	

City reports for week ended December 5, 1931

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during nonepidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1922 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	8	1	2	....	0	21	0	1
New Hampshire:								
Concord	0	0	0	....	0	0	0	1
Nashua	0	0	0	....	0	0	1	0
Vermont:								
Barre	0	0	0	....	0	1	0	0
Burlington	3	1	0	....	0	10	0	0
Massachusetts:								
Boston	64	38	17	1	0	3	10	17
Fall River	9	4	2	....	0	1	1	3
Springfield	7	5	0	....	0	4	8	1
Worcester	8	6	0	....	0	1	61	1
Rhode Island:								
Pawtucket	0	2	0	....	0	0	0	0
Providence	4	9	1	2	0	169	12	2
Connecticut:								
Bridgeport	2	5	0	3	1	0	0	5
Hartford	4	6	2	....	0	0	16	2
New Haven	16	1	0	4	0	0	7	5
MIDDLE ATLANTIC								
New York:								
Buffalo	47	15	6	1	1	2	0	12
New York	138	173	92	21	3	43	25	120
Rochester	17	4	0	....	0	20	8	4
Syracuse	11	2	0	....	0	3	4	2
New Jersey:								
Camden	3	7	5	2	0	0	0	7
Newark	22	16	2	3	0	0	8	7
Trenton	6	2	2	....	0	0	4	1
Pennsylvania:								
Philadelphia	118	60	6	6	3	2	20	40
Pittsburgh	64	22	7	1	3	177	52	18
Reading	20	2	0	....	0	1	0	2
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	16	12	12	....	1	0	0	12
Cleveland	171	38	4	6	1	23	82	17
Columbus	22	7	8	....	0	3	6	1
Toledo	79	8	6	....	0	1	0	5
Indiana:								
Fort Wayne	2	5	11	....	0	0	0	0
Indianapolis	69	12	6	....	2	4	53	10
South Bend	2	2	0	....	0	0	0	0
Terre Haute	9	1	2	....	0	0	0	2
Illinois:								
Chicago	106	121	74	5	5	15	9	33
Peoria	14	2	6	....	0	0	1	1
Springfield	2	2	3	....	0	0	1	1
Michigan:								
Detroit	44	60	30	2	1	1	2	17
Flint	24	3	1	....	0	3	12	0
Grand Rapids	21	1	0	....	0	1	5	0

City reports for week ended December 5, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—Con.								
Wisconsin:								
Kenosha	4	1	0	----------	0	0	2	0
Madison	8	1	7	----------	----------	1	1	----------
Milwaukee	77	15	4	----------	0	1	16	0
Racine	41	2	0	----------	0	0	26	0
Superior	2	1	0	----------	0	0	8	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	19	0	0	----------	0	0	0	1
Minneapolis	74	20	14	----------	1	1	39	4
St. Paul	17	7	1	1	1	0	4	8
Iowa:								
Davenport	3	1	1	----------	----------	0	0	----------
Des Moines	1	2	6	----------	----------	0	0	----------
Sioux City	18	1	4	----------	----------	1	1	----------
Waterloo	12	0	1	----------	----------	0	0	----------
Missouri:								
Kansas City	30	8	9	----------	0	1	0	6
St. Joseph	6	2	6	----------	0	1	1	2
St. Louis	23	43	38	----------	----------	3	2	8
North Dakota:								
Fargo	23	0	0	----------	0	0	0	1
Grand Forks	4	0	0	----------	----------	0	0	----------
South Dakota:								
Aberdeen	20	0	0	----------	----------	37	0	----------
Sioux Falls	0	0	0	----------	----------	0	0	----------
Nebraska:								
Omaha	30	9	31	----------	0	2	5	5
Kansas:								
Topeka	7	1	1	----------	0	1	0	3
Wichita	15	2	11	----------	0	4	0	2
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	2	0	----------	0	0	1	0
Maryland:								
Baltimore	71	24	10	4	0	4	26	18
Cumberland	12	0	0	----------	0	1	0	0
Frederick	0	0	0	----------	0	0	0	1
District of Columbia:								
Washington	4	18	20	1	1	2	0	16
Virginia:								
Lynchburg	----------	4	----------	----------	----------	----------	----------	----------
Norfolk	5	3	4	----------	0	0	0	0
Richmond	4	14	21	----------	0	0	0	4
Roanoke	8	3	6	----------	0	0	0	0
West Virginia:								
Charleston	7	2	0	----------	0	0	0	3
Huntington	0	----------	2	----------	0	0	0	0
Wheeling	8	1	0	----------	0	0	0	2
North Carolina:								
Raleigh	1	2	4	----------	0	15	0	1
Wilmington	0	2	0	----------	0	0	0	2
Winston-Salem	13	3	2	----------	0	0	0	2
South Carolina:								
Charleston	1	1	2	25	0	0	0	2
Columbia	0	1	1	----------	0	0	0	14
Greenville	1	0	0	----------	0	0	0	0
Georgia:								
Atlanta	18	7	5	5	0	0	1	7
Brunswick	0	0	0	----------	0	0	3	0
Savannah	0	2	1	31	1	0	0	1
Florida:								
Miami	0	2	2	----------	0	0	0	1
Tampa	0	2	1	----------	0	0	0	0

City reports for week ended December 5, 1931—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	1	0		0	0	0	0
Lexington	1		1		0	0	1	0
Louisville	6		2		0	0	0	4
Tennessee:								
Memphis	2	8	15		1	1	1	4
Nashville	0	3	4		3	0	0	2
Alabama:								
Birmingham	1	7	8		1	2	0	9
Mobile	0	1	0		1	0	0	0
Montgomery	1	2	1	4		3	4	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith	0	1	3			0	0	
Little Rock	1	1	7		0	0	1	2
Louisiana:								
New Orleans	0	15	10	1	0	0	0	12
Shreveport	7	1	2		0	7	0	4
Oklahoma:								
Muskogee	1		5		0	0	0	0
Texas:								
Dallas	2	18	17	1	1	0	0	9
Fort Worth	1	11	21		0	0	0	5
Galveston	0	1	5		0	0	0	2
Houston	0	10	28		0	1	0	7
San Antonio	0	5	0		1	0	0	3
MOUNTAIN								
Montana:								
Billings	0	0	0		0	69	0	0
Great Falls	0	0	0		0	1	0	0
Helena	1	0	0		0	14	0	0
Missoula	0	0	0		0	0	0	0
Idaho:								
Boise	0	0	0		0	0	0	1
Colorado:								
Denver	35	10	6		1	3	0	8
Pueblo	16	1	0		0	0	0	1
New Mexico:								
Albuquerque	7	1	0		0	1	1	1
Arizona:								
Phoenix	0	0	1		0	1	0	1
Utah:								
Salt Lake City	90	4	0		0	0	3	3
Nevada:								
Reno	0	0	0		0	0	0	1
PACIFIC								
Washington:								
Seattle	79	5	5			32	22	
Spokane	8	2	0			1	0	
Tacoma	19	3	3		0	0	2	3
Oregon:								
Portland	28	11	0	4	0	5	16	8
Salem	6	1	0	7	0	0	2	0
California:								
Los Angeles	31	38	33	41	5	8	11	11
Sacramento	3	3	1	1	1	44	0	8
San Francisco	62	14	3	9	2	7	3	10

City reports for week ended December 5, 1931—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	3	12	0	0	0	1	0	0	0	4	27
New Hampshire:											
Concord	0	1	0	0	0	0	0	0	0	0	18
Nashua	0	0	0	0	0	0	0	0	0	1	--------
Vermont:											
Barre	0	0	0	0	0	2	0	0	0	3	5
Burlington	1	0	0	0	0	1	0	0	0	0	7
Massachusetts:											
Boston	64	60	0	0	0	14	2	1	0	28	206
Fall River	3	5	0	0	0	1	0	0	0	1	27
Springfield	5	2	0	0	0	0	0	0	1	6	29
Worcester	12	26	0	0	0	3	0	0	0	11	39
Rhode Island:											
Pawtucket	1	0	0	0	0	0	0	0	0	0	--------
Providence	11	9	0	0	0	4	0	0	0	3	53
Connecticut:											
Bridgeport	6	4	0	23	0	2	0	1	0	0	37
Hartford	6	2	0	0	0	0	0	0	0	4	41
New Haven	3	1	0	0	0	0	0	0	0	8	44
MIDDLE ATLANTIC											
New York:											
Buffalo	22	24	0	1	0	8	1	1	0	36	115
New York	124	114	0	0	0	83	14	6	2	93	1,306
Rochester	8	37	0	0	0	2	0	0	0	9	57
Syracuse	9	23	0	0	0	0	0	0	0	57	41
New Jersey:											
Camden	4	5	0	0	0	1	0	0	0	0	31
Newark	13	17	0	0	0	8	0	0	0	32	103
Trenton	3	3	0	0	0	7	0	[1] 2	0	1	36
Pennsylvania:											
Philadelphia	69	71	0	0	0	31	3	1	0	120	477
Pittsburgh	39	53	0	1	0	5	0	2	1	25	163
Reading	0	0	0	0	0	1	0	0	0	2	29
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	17	40	0	0	0	11	1	0	0	2	128
Cleveland	34	54	0	0	0	21	1	0	0	126	168
Columbus	10	20	0	0	0	2	0	0	0	5	68
Toledo	12	8	1	0	0	1	1	5	0	47	71
Indiana:											
Fort Wayne	3	1	0	0	0	1	0	0	0	0	27
Indianapolis	14	8	3	0	0	5	0	0	0	9	--------
South Bend	3	2	0	0	0	0	0	0	0	1	14
Terre Haute	3	1	0	0	0	0	0	0	0	0	19
Illinois:											
Chicago	100	125	0	0	0	37	3	3	0	144	590
Peoria	--------	5	--------	0	0	1	--------	0	0	11	20
Springfield	2	11	0	0	0	0	0	0	0	8	27
Michigan:											
Detroit	82	73	0	0	0	20	1	3	0	46	222
Flint	11	4	1	0	0	2	0	0	0	20	15
Grand Rapids	10	6	1	0	0	0	0	0	0	2	14
Wisconsin:											
Kenosha	0	4	1	0	0	0	0	0	0	5	6
Madison	2	1	1	0	--------	--------	0	0	--------	0	--------
Milwaukee	19	16	0	0	0	0	1	0	0	93	91
Racine	5	8	0	0	0	2	0	0	0	0	13
Superior	3	0	0	0	0	0	0	0	0	0	5

[1] Nonresidents.

City reports for week ended December 5, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	1	0	0	0	0	0	1	0	0	24
Minneapolis	41	14	1	0	0	2	0	0	0	15	74
St. Paul	17	16	0	0	0	1	0	0	0	3	73
Iowa:											
Davenport	1	2	2	0	...	...	0	0	...	0	...
Des Moines	9	10	2	0	...	...	0	0	...	0	25
Sioux City	2	1	0	1	...	...	0	0	...	7	...
Waterloo	3	1	0	0	...	...	0	1	...	11	...
Missouri:											
Kansas City	14	19	0	0	0	4	0	0	0	6	88
St. Joseph	3	1	0	0	0	0	0	0	1	3	29
St. Louis	30	15	0	0	0	11	2	0	0	51	191
North Dakota:											
Fargo	2	4	0	0	0	0	0	0	0	4	10
Grand Forks	1	1	0	0	...	...	0	0	...	0	...
South Dakota:											
Aberdeen	0	2	0	0	...	...	0	0	...	5	...
Sioux Falls	1	0	0	0	...	...	0	0	...	0	7
Nebraska:											
Omaha	7	0	2	0	0	2	0	0	0	1	70
Kansas:											
Topeka	2	3	1	0	0	0	0	0	0	0	13
Wichita	4	0	0	1	0	1	0	0	0	0	31
SOUTH ATLANTIC											
Delaware:											
Wilmington	2	0	0	0	0	0	0	0	0	4	15
Maryland:											
Baltimore	22	18	0	0	0	10	2	3	0	101	189
Cumberland	1	4	0	0	0	0	0	0	0	2	12
Frederick	0	2	0	0	0	0	0	0	0	0	4
District of Columbia:											
Washington	18	16	0	0	0	9	1	0	0	14	156
Virginia:											
Lynchburg	1	...	0	...	...	...	0	...	...	...	...
Norfolk	8	11	0	0	0	1	0	0	0	0	...
Richmond	8	20	0	0	0	8	0	0	0	2	49
Roanoke	4	2	0	0	0	0	0	0	1	1	13
West Virginia:											
Charleston	2	1	0	0	0	0	0	[1] 2	1	3	22
Huntington	...	6	...	0	0	0	...	0	0	0	...
Wheeling	2	1	0	0	0	1	0	0	0	4	20
North Carolina:											
Raleigh	3	1	0	0	0	0	0	0	0	3	11
Wilmington	1	0	0	0	0	1	0	0	0	4	13
Winston-Salem	2	2	1	0	0	1	0	0	0	7	15
South Carolina:											
Charleston	2	1	0	0	0	3	0	0	0	0	20
Columbia	1	0	0	0	0	1	0	0	1	0	61
Greenville	0	1	0	0	0	0	0	0	0	0	...
Georgia:											
Atlanta	6	12	0	0	0	6	0	0	0	0	65
Brunswick	0	0	0	0	0	1	0	0	0	0	5
Savannah	1	2	0	0	0	0	1	0	0	0	30
Florida:											
Miami	1	0	0	0	0	2	0	0	0	0	20
Tampa	1	5	0	0	0	0	0	3	0	0	19
EAST SOUTH CENTRAL											
Kentucky:											
Covington	4	2	0	0	0	0	0	0	0	0	12
Lexington	...	2	...	0	0	0	...	0	0	1	15
Louisville	...	16	...	0	0	2	...	0	0	14	63
Tennessee:											
Memphis	7	8	1	0	0	6	2	1	1	20	70
Nashville	4	3	0	0	0	3	1	0	0	7	41
Alabama:											
Birmingham	4	6	0	0	0	3	1	1	0	1	68
Mobile	1	3	0	0	0	4	0	0	0	0	31
Montgomery	0	0	0	0	...	...	0	0	...	0	...

[1] Nonresident.

City reports for week ended December 5, 1931—Continued

Division, State, and city	Scarlet fever: Cases, estimated expectancy	Scarlet fever: Cases reported	Smallpox: Cases, estimated expectancy	Smallpox: Cases reported	Smallpox: Deaths reported	Tuberculosis, deaths reported	Typhoid fever: Cases, estimated expectancy	Typhoid fever: Cases reported	Typhoid fever: Deaths reported	Whooping cough, cases reported	Deaths, all causes
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	1	1	0	0			0	0		2	
Little Rock	3	3	0	0	0	0	0	1	0	0	2
Louisiana:											
New Orleans	9	9	0	0	0	4	2	5	2	0	122
Shreveport	2	2	0	0	0	1	0	0	1	3	80
Oklahoma:											
Muskogee		0		0	0	0		0	0	0	
Texas:											
Dallas	9	10	1	0	0	5	0	0	0	8	64
Fort Worth	2	8	0	1	0	3	0	1	1	0	36
Galveston	0	0	0	0	0	1	0	0	0	0	25
Houston	3	5	1	1	0	3	0	1	0	0	73
San Antonio	1	2	1	0	0	7	0	1	0	0	72
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	2	0	2	3
Great Falls	2	2	0	0	0	0	0	0	0	0	7
Helena	1	0	0	0	0	0	0	0	0	1	7
Missoula	1	1	0	0	0	0	0	0	0	0	10
Idaho:											
Boise	1	0	0	0	0	0	0	0	0	0	3
Colorado:											
Denver	13	19	0	0	0	5	0	0	0	7	80
Pueblo	1	1	0	0	0	0	0	1	0	4	7
New Mexico:											
Albuquerque	1	1	0	0	0	3	0	4	0	0	11
Arizona:											
Phoenix	1	0	0	0	0	2		0	0	0	
Utah:											
Salt Lake City	2	2	1	0	0	0	0	0	0	0	31
Nevada:											
Reno	0	0	0	0	0	0	0	0	0	0	6
PACIFIC											
Washington:											
Seattle	10	15	1	0			1	0		8	
Spokane	8	0	3	2			0	1		4	
Tacoma	4	4	1	0	0	1	0	0	0	3	33
Oregon:											
Portland	8	1	8	1	0	1	1	0	0	1	74
Salem	1	0	0	0	0	0	0	0	0	1	
California:											
Los Angeles	27	27	1	0	0	11	1	2	0	18	263
Sacramento	3	0	1	0	0	2	0	1	0	0	32
San Francisco	15	5	0	3	0	7	0	1	0	9	155

City reports for week ended December 5, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
NEW ENGLAND									
Maine:									
Portland	0	0	0	0	0	0	0	1	0
Massachusetts:									
Boston	0	0	0	0	0	0	2	3	0
Fall River	1	1	0	0	0	0	0	0	0
Rhode Island:									
Providence	0	0	0	0	0	0	0	1	0
MIDDLE ATLANTIC									
New York:									
New York [1]	7	3	1	0	0	0	2	3	0
Syracuse	0	1	0	0	0	0	0	0	0
New Jersey:									
Newark	0	0	0	0	0	0	0	1	0
Pennsylvania:									
Philadelphia	3	2	1	1	0	0	0	1	0
Pittsburgh	3	1	0	0	0	0	0	1	1
EAST NORTH CENTRAL									
Indiana:									
Indianapolis	13	3	0	0	0	0	0	0	0
Illinois [1]									
Chicago	2	0	1	0	0	0	1	0	0
Michigan:									
Detroit	2	0	0	1	0	0	0	0	0
Wisconsin:									
Milwaukee	0	0	0	0	0	0	0	1	0
WEST NORTH CENTRAL									
Minnesota:									
Duluth	0	0	0	0	0	0	0	1	0
Minneapolis	1	0	0	0	0	0	0	1	0
St. Paul	0	0	0	0	0	0	0	2	0
Iowa:									
Des Moines	0	0	0	0	0	0	0	1	0
Waterloo	1	0	0	0	0	0	0	0	0
Missouri:									
Kansas City	0	1	0	0	1	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	0	0	0	1	0	0	1	1	0
District of Columbia:									
Washington	1	1	0	0	0	0	0	1	0
North Carolina:									
Winston-Salem	0	0	0	0	1	0	0	0	0
South Carolina:									
Charleston [1]	0	0	0	0	3	0	0	0	0
Columbia	0	0	0	0	0	1	0	0	0
Georgia: [1]									
Savannah [1]	0	0	0	0	3	0	0	0	0
Florida:									
Miami	0	0	0	0	2	0	0	0	0
EAST SOUTH CENTRAL									
Kentucky:									
Louisville	1	1	0	0	0	0	0	0	0
Tennessee:									
Memphis	0	2	0	0	0	1	0	0	0
Nashville	1	1	0	0	0	0	0	0	0
Alabama:									
Birmingham	0	0	0	0	1	1	0	0	0

[1] Typhus fever, 8 cases: 1 case at New York City, N. Y., 1 case at Springfield, Ill., 3 cases at Charleston, S. C., 1 case at Atlanta, Ga., and 2 cases at Savannah, Ga.

City reports for week ended December 5, 1931—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases, estimated expectancy	Cases	Deaths
WEST SOUTH CENTRAL									
Louisiana:									
New Orleans	0	0	0	0	1	1	1	0	0
Texas:									
Dallas	0	0	0	0	1	1	0	0	0
Galveston	0	0	0	0	0	2	0	0	0
Houston	0	1	0	0	0	1	0	1	0
MOUNTAIN									
Utah:									
Salt Lake City	1	2	0	0	0	0	0	0	0
PACIFIC									
Washington:									
Seattle	3	0	0	0	0	0	0	0	0
Spokane	0	0	0	0	0	0	0	1	0
Tacoma	0	0	0	0	0	0	0	1	0
California:									
Los Angeles	1	0	0	0	1	0	1	0	0
San Francisco	2	2	0	0	0	0	1	3	0

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended December 5, 1931, compared with those for a like period ended December 6, 1930. The population figures used in computing the rates are estimated mid-year populations for 1930 and 1931, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 33,000,000. The 91 cities reporting deaths have more than 31,500,000 estimated population.

Summary of weekly reports from cities, November 1 to December 5, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930	Dec. 5, 1931	Dec. 6, 1930
98 cities	94	[2] 82	96	89	96	100	[3] 85	87	[4] 101	[5] 90
New England	84	85	50	82	70	123	67	87	58	121
Middle Atlantic	32	33	52	44	53	52	58	48	54	58
East North Central	97	109	80	128	91	124	[6] 72	122	94	112
West North Central	155	[2] 77	184	107	174	110	[7] 151	110	222	101
South Atlantic	182	86	146	120	172	154	144	66	[4] 150	112
East South Central	268	215	227	185	169	275	145	138	163	143
West South Central	203	199	233	160	206	171	[8] 207	153	244	[5] 147
Mountain	44	123	61	26	17	26	[9] 27	79	52	18
Pacific	100	93	127	63	98	63	67	95	88	65

MEASLES CASE RATES

98 cities	44	[2] 59	55	91	85	126	[3] 91	107	[4] 114	[5] 142
New England	161	128	238	172	233	179	315	162	481	220
Middle Atlantic	27	34	38	68	92	76	82	69	111	85
East North Central	18	16	18	17	29	31	[6] 15	28	31	28
West North Central	15	[2] 282	17	502	19	767	[7] 15	649	27	953
South Atlantic	12	48	10	26	34	64	28	44	[4] 44	62
East South Central	12	84	12	18	29	149	35	66	35	155
West South Central	27	0	24	0	10	3	[8] 24	10	27	[5] 11
Mountain	444	229	400	308	757	826	[9] 1,277	282	757	53
Pacific	104	24	135	32	149	28	123	10	180	26

SCARLET FEVER CASE RATES

98 cities	169	[2] 169	170	187	187	195	[3] 156	174	[4] 179	[5] 202
New England	202	225	221	276	260	237	262	264	293	268
Middle Atlantic	134	133	131	126	163	159	147	148	155	178
East North Central	239	231	215	287	241	263	[6] 171	221	220	257
West North Central	140	[2] 140	149	143	132	219	[7] 123	139	161	198
South Atlantic	190	158	239	154	259	216	176	188	[4] 175	230
East South Central	99	293	198	275	145	209	122	215	128	299
West South Central	95	91	122	118	78	94	[8] 93	132	108	[5] 92
Mountain	252	282	313	388	218	282	[9] 198	229	218	141
Pacific	121	95	96	99	129	87	108	83	100	97

SMALLPOX CASE RATES

98 cities	3	[2] 2	1	4	1	3	[3] 3	8	[4] 5	[5] 7
New England	0	0	0	0	0	0	0	0	55	0
Middle Atlantic	0	0	0	0	0	0	0	0	1	0
East North Central	0	4	0	2	0	0	[6] 0	4	0	1
West North Central	11	[2] 6	4	21	10	23	[7] 13	68	4	48
South Atlantic	0	0	0	0	0	0	0	0	[4] 0	0
East South Central	12	0	6	0	0	0	6	0	0	0
West South Central	3	7	3	3	0	3	[8] 21	3	3	[5] 4
Mountain	0	9	9	0	0	44	[9] 0	35	0	106
Pacific	6	6	4	18	6	6	6	8	10	10

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1931, and 1930, respectively.
[2] Waterloo, Iowa, not included.
[3] South Bend, Ind., St. Paul, Minn., Fort Smith, Ark., and Reno, Nev., not included.
[4] Lynchburg, Va., not included.
[5] Shreveport, La., not included.
[6] South Bend, Ind., not included.
[7] St. Paul, Minn., not included.
[8] Fort Smith, Ark., not included.
[9] Reno, Nev., not included.

Summary of weekly reports from cities, November 1 to December 5, 1931—Annual rates per 100,000 population compared with rates for the corresponding period of 1930—Continued

TYPHOID FEVER CASE RATES

	Week ended—									
	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930	Dec. 5, 1931	Dec. 6, 1930
98 cities	12	[2] 11	12	15	12	15	[3] 7	10	[4] 7	[5] 10
New England	10	5	7	24	10	17	2	12	5	7
Middle Atlantic	11	5	6	4	8	5	4	3	5	8
East North Central	6	9	11	5	5	9	[6] 6	4	4	10
West North Central	21	[2] 4	13	19	8	23	[7] 9	8	4	6
South Atlantic	30	32	36	34	24	28	34	32	[4] 16	18
East South Central	17	24	23	48	41	12	6	12	12	12
West South Central	30	28	24	87	41	84	[8] 7	70	27	[5] 26
Mountain	9	18	0	26	9	53	[9] 0	9	26	9
Pacific	0	16	10	10	18	10	2	6	10	10

INFLUENZA DEATH RATES

	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930	Dec. 5, 1931	Dec. 6, 1930
91 cities	7	9	8	9	7	10	[10] 7	9	[4] 7	[5] 9
New England	12	2	14	5	7	7	0	2	2	5
Middle Atlantic	8	12	10	8	6	7	9	11	4	6
East North Central	5	6	2	9	4	5	[6] 5	7	6	8
West North Central	6	3	6	6	6	6	[7] 3	0	6	12
South Atlantic	4	10	6	6	12	24	6	10	[4] 4	20
East South Central	0	26	0	39	25	13	13	26	38	13
West South Central	17	14	7	28	10	36	17	14	7	[5] 34
Mountain	17	9	27	9	17	62	[9] 27	26	9	18
Pacific	5	7	12	5	5	7	7	7	19	2

PNEUMONIA DEATH RATES

	Nov. 7, 1931	Nov. 8, 1930	Nov. 14, 1931	Nov. 15, 1930	Nov. 21, 1931	Nov. 22, 1930	Nov. 28, 1931	Nov. 29, 1930	Dec. 5, 1931	Dec. 6, 1930
91 cities	88	101	86	115	101	116	[10] 86	109	[4] 89	[5] 99
New England	67	89	101	114	84	126	99	77	91	73
Middle Atlantic	107	116	106	129	116	133	98	118	95	101
East North Central	64	74	52	85	70	82	[6] 52	78	56	77
West North Central	80	87	88	78	115	138	[7] 119	93	88	132
South Atlantic	117	152	97	172	152	156	122	180	[4] 146	154
East South Central	120	136	151	188	183	175	107	136	95	155
West South Central	66	110	55	103	79	114	66	153	135	[5] 128
Mountain	139	104	148	220	174	167	[9] 126	229	122	132
Pacific	53	42	70	67	50	50	74	70	77	60

[2] Waterloo, Iowa, not included.
[3] South Bend, Ind., St. Paul, Minn., Fort Smith, Ark., and Reno, Nev., not included.
[4] Lynchburg, Va., not included.
[5] Shreveport, La., not included.
[6] South Bend, Ind., not included.
[7] St. Paul, Minn., not included.
[8] Fort Smith, Ark., not included.
[9] Reno, Nev., not included.
[10] South Bend, Ind., St. Paul, Minn., and Reno, Nev., not included.

FOREIGN AND INSULAR

BRITISH GUIANA

Deaths from certain diseases—1928, 1929, 1930.—According to the annual report of the Surgeon General of British Guiana for the year 1930, deaths from certain diseases were reported in the colony during the years 1928, 1929, and 1930, as follows:

Disease	1928	1929	1930	Disease	1928	1929	1930
Ancylostomiasis	33	10	28	Influenza	91	121	94
Blackwater fever	6	11	12	Malaria	1,563	1,198	1,104
Diarrhea and enteritis	557	448	380	Nephritis	694	514	528
Dysentery	185	141	105	Pneumonia	711	661	588
Filariasis	47	52	37	Tuberculosis	301	276	302
Heart disease	363	351	359	Typhoid fever	58	44	53

Population Dec. 31, 1930, 312,489.

CANADA

Provinces—Communicable diseases—Week ended November 28, 1931.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended November 28, 1931, as follows:

Province	Cerebrospinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia		19			1	3
New Brunswick						4
Quebec	2			17		15
Ontario	1	6	2		2	11
Manitoba	1				1	8
Saskatchewan					5	
Alberta					2	
British Columbia						1
Total	4	25	2	17	11	42

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended November 28, 1931.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended November 28, 1931, as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	2	Paratyphoid fever	1
Chicken pox	142	Poliomyelitis	17
Diphtheria	53	Scarlet fever	80
Erysipelas	6	Tuberculosis	17
German measles	9	Typhoid fever	14
Measles	165	Whooping cough	73
Mumps	29		

CUBA

Habana—Communicable diseases—Four weeks ended November 7, 1931.—During the four weeks ended November 7, 1931, certain communicable diseases were reported in the city of Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Chicken pox	2		Poliomyelitis	2	
Diphtheria	9	1	Scarlet fever	2	
Leprosy	2		Tuberculosis	23	4
Malaria	18		Typhoid fever	9	4
Measles	54				

GREAT BRITAIN

England and Wales—Vital statistics—July–September, 1931.—During the third quarter of the year 1931, 161,267 births and 96,745 deaths were registered in England and Wales, giving a birth rate on an annual basis of 16.0 per 1,000 population and a death rate of 9.6 per 1,000. The figures are provisional. The mortality of infants under 1 year of age was 45 per 1,000 live births.

During the 13 weeks ended October 3, 1931, deaths from certain communicable diseases were reported in 107 boroughs and great towns, including Greater London, as follows:

Disease	Number of deaths	Death rate per 1,000 population	Disease	Number of deaths	Death rate per 1,000 population
Diarrhea and enteritis (under 2 years)	566		Scarlet fever	44	0.01
Diphtheria	208	0.06	Smallpox	0	
Influenza	259	.05	Typhoid fever	18	
Measles	146	.03	Whooping cough	315	.05

Deaths from certain communicable diseases in 159 smaller towns for the quarter ended September 30, 1931, were as follows:

Disease	Deaths	Disease	Deaths
Diarrhea and enteritis (under 2 years)	73	Scarlet fever	10
Diphtheria	46	Smallpox	0
Influenza	63	Typhoid fever	9
Measles	35	Whooping cough	38

England and Wales—Communicable diseases—Thirteen weeks ended October 3, 1931.—During the 13 weeks ended October 3, 1931, cases of certain communicable diseases were reported in England and Wales as follows (civilians only):

Disease	Cases	Disease	Cases
Diphtheria	10,820	Puerperal pyrexia	1,406
Ophthalmia neonatorum	1,369	Scarlet fever	18,941
Pneumonia	6,701	Smallpox	459
Puerperal fever	512	Typhoid fever	737

Scotland—Vital statistics—Quarter ended September 30, 1931.—The Registrar General of Scotland has published the following statistics for the third quarter of the year 1931:

Population (provisional)	4,842,554	Deaths from—Continued.	
Births	22,659	Heart disease	1,016
Birth rate per 1,000 population	18.6	Influenza	56
Deaths	13,242	Pneumonia	133
Death rate per 1,000 population	10.8	Pneumonia, lobar	185
Marriages	9,351	Measles	97
Deaths under 1 year	1,353	Nephritis (acute)	46
Deaths under 1 year per 1,000 births	60	Nephritis (chronic)	293
Deaths from—		Puerperal sepsis	31
Bronchitis	433	Scarlet fever	19
Broncho-pneumonia	304	Syphilis	24
Cerebrospinal fever	54	Tetanus	2
Diabetes	164	Tuberculosis	928
Diphtheria	69	Typhoid fever	6
Dysentery	2	Whooping cough	121
Erysipelas	29		

SWITZERLAND

Deaths from tuberculosis—1911–1920, 1921–1930.—According to a recent report, deaths from all forms of tuberculosis occurred in Switzerland, during the 10-year periods 1911–1920 and 1921–1930, as follows:

Age group	Deaths			
	1911–1920		1921–1930	
	Males	Females	Males	Females
0–14	4,757	5,505	2,588	2,988
15–29	9,495	13,911	7,039	11,353
30–49	12,276	11,459	8,737	8,120
50–69	8,148	7,115	7,135	5,982
70 and over	1,488	2,241	1,406	2,158
Total	36,164	40,231	26,905	30,601

The population of Switzerland, according to the census of Dec. 31, 1930, is 4,082,511.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Week ended— Sept. 26, 1931	October, 1931: 3	October, 1931: 10	October, 1931: 17	October, 1931: 24	October, 1931: 31	November, 1931: 7	November, 1931: 14	November, 1931: 21	November, 1931: 28	December, 1931: 5	December, 1931: 12
Ceylon: Colombo	C	1		3											1	1	
	D	1		3											1	1	
China:																	
Canton	C	1			2											3	
Hankow	C							8		5	18						
	D							6			1						
Shanghai	C		1	7	125	35	29	17	17	8							
	D				9	5	8			4							
Swatow	C	10	7														
Tientsin	C	10															
	D	1															
India	C	18,001	22,074	36,514	39,223	7,552	10,172	4,556									
	D	10,337	12,093	20,276	21,653	3,716	4,808	2,450									
Bombay	C		23	44	42	1	1	2		4	1			1	3		
	D		16	25	17		1	2			1			1	4		
Calcutta	C	292	237	110	46	18	23	3	7	14	13	19	25	22	19		
	D	163	155	30	15	6	12		5	9	4	10	14	15	11		
Chittagong	C								1								
Karikal	C			1	2	1											
	D			1	2												
Madras	C	9	4	6	5												
	D	4															
Moulmein	C		1														
	D		1														
Negapatam	C				1												
Rangoon	C	4	4	1		1				1							
	D	2	1	1		1				1							
Vizagapatam	C	1															

India (French):																	
Chandernagor	C	3	5	7	2	1				1							
	D	3	1	7	2	1				1							
Pondicherry	C	3	3	3	4		1										
	D	3	3	2	2												
India (Portuguese)	C	1	2	2	34		17	19	39	18	20						
	D		1	2	18		10	4	12	3	6						
Indo-China (see also table below):																	
Cochin-China—Rachgia	C			P													
Pnompenh	C	1	5	2	2		1				2	2					
	D	1	2	1	2		1										
Saigon and Cholon	C	61	14					1									
	D	41	7					1									
Iraq:																	
Abulkhasib	C				6												
	D				5												
Amara	C			2	66			2	2	2			3	3			
	D			1	59				1	1			2	4			
Amara Province	C				96	32	21	15	27	13	7	15			3		
	D				120	29	24	14	17	10	6	8			2		
Basra	C			547	293	77	19	29	32	38	30	9	1				
	D			287	154	34	11	13	26	7	18	10	1				
Basra Province	C			5	53	26	14	1	1	3	7						
	D			2	30	9	8	1	1	1	4						
Dinwaniyah	C					1											
Dinwaniyah Province	C					15	8	14	24	22	1						
	D					11	6	5	22	10	5						
Iwaniyah	C					22											
	D					15											
Kut Province	C										17	3					
	D										12	2					
Muntafiq Province	C				225	55	54	45	55	17	19	9	23	1	1		
	D				145	38	57	28	37	10	18	6	17	3			
Nasiriyah	C				88	4	4	18	7	4	7	6	7	2	6		
	D				75	3	4	18	3	3	6	3	6		7		
Suqelshuyukh	C				2												
	D				2												
Japan: Taiwan—Kelung	C											2					
Persia:[1]																	
Abadan	C								1		3			1			
Ahwaz	C								12		84	16	3		9		
	D								7		69	21	8		7		
Khorramabad	C													18	16		
	D													10	10		
Mohammerah	C								1								

[1] On Oct. 23, 1931, cholera was reported at Mohammerah, Abadan, and Ahwaz, Persia. During the period from Oct. 22 to Nov. 7, 1931, 141 cases and 97 deaths were reported. The diagnosis of cholera was not confirmed upon bacteriological examination.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Week ended— Sept. 26, 1931	October, 1931 3	10	17	24	31	November, 1931 7	14	21	28	December, 1931 5	12
Philippine Islands:[2]																	
Provinces—																	
Capiz	C	4			35	49	21	5	4		7	5			4	16	7
	D	4			16	35	16	5	3		5	4			4	10	5
Cebu	C			3													
	D			3													
Iloilo	C	26	27														
	D	21	25														
Negros: Occidental	C	2															
	D	1															
Siam	C	4	3	1	1												
	D	2	1		1												
Bangkok	C	1	4	1	1												
	D	1	2														
On vessel:																	
S. S. City of Eastborne, at Calcutta, from Cocanada	C	1															
S. S. Tairea, at Penang, from Calcutta	C	1															
S. S. Bandar Shalpour, at Bushire, Persia, from Basra	C		1														
	D		1														
S. S. Kohistan, at Basra, from Bushire, Persia	C		2														
S. S. Cathay, at Kobe, Japan, from Shanghai	C			4													
	D			1													
S. S. Kasagi Maru, at Moji, from Shanghai	C				1												
S. S. Ankoo, at Nagasaki, from Shanghai	C				2												
	D				1												

[2] Figures for cholera in the Philippine Islands are subject to correction.

Place		May, 1931	June, 1931	July, 1931	August, 1931 1–10	August, 1931 11–20	August, 1931 21–31	September, 1931 1–10	September, 1931 11–20	September, 1931 21–30	October, 1931 1–10	October, 1931 11–20	October, 1931 21–31	Nov. 1–10, 1931
Indo-China (French) (see also table above):														
Cambodia [1]	C	117	308	241	12				8	6	1	16	2	3
	D	63	109	60	2				4	3	1	15	1	
Cochin-China [1]	C	174	140	143	39				9	9	11	2	1	5
	D	133	106	42	32				6	7	10	2	1	4

[1] Reports incomplete.

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Aug. 23–Sept 19, 1931	Week ended— Sept. 26, 1931	October, 1931 3	10	17	24	31	November, 1931 7	14	21	28	December, 1931 5	12
Algeria:																	
Algiers	C			2													
Bone	C	1															
Philippeville	C		1	2													
	D		1	1													
Argentina: San Juan Province	C		P														
Belgian Congo	C	1															
	D	1															
British East Africa (see also table below):																	
Tanganyika	C	17	6	8	4	8	2		3								
	D	10	6	2	4	4			1								
Uganda	C	298	418	285	289	83	62	67	64	71							
	D	286	400	281	207	82	63	67	58	69							
Ceylon: Colombo	C	2	1	6	3	1	1	2							1		
	D	2	1	6	3	1	1	1							1		
Plague-infected rats				8													
Chile: Santiago	C								1								
	D								1								

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Aug. 23–Sept. 19, 1931	Week ended— Sept. 26, 1931	October, 1931: 3	10	17	24	31	November, 1931: 7	14	21	28	December, 1931: 5	12
China:[1]																	
Shansi Province[2]	C										P						
Shensi Province[2]	C										P						
Dutch East Indies:																	
Batavia and West Java	C	116	75	58	65	21	31		29	25	34	1					
	D	66	75	58	65	21	31		29	28	34						
Java and Madura	D	192	212	205	233	77	69	85	94	97	133						
Ecuador (see table below).																	
Egypt:																	
Alexandria	C	4	13	9	5	1				1	1	3	1		1	1	1
	D	4	5	3	2							1	1	1	1		
Assiout	C	11															1
	D	1															
Beheira	C				2												
Dakahlia	C		1	2													
Deirout	C	3															
	D	1															
Gharbieh	C	1															
	D	1															
Girga	C		1													1	
Kena	C													2			2
	D													1			2
Minieh	C	3	12									1	3			1	1
	D	1	4									1	1				
Port Said	C	3	5	2						1			1	2		2	
	D	2	1											2			
Tanta	C			2	2									2			
	D													2			
France: Rouen—Devilleles	C										P						

Hawaii Territory:																	
Hawaii—Hamakua—Plague-infected rats				1													
Maui Island—																	
Haliimaile—Plague-infected rats					1												
Kula District	C			1													
	D			1													
Makawao—Plague-infected rats					1												
Paia—Plague-infected rats						1											
Paaulo—Plague-infected rats											1						
India	C	88	221	684	1,832	723	527	600									
	D	51	128	440	772	355	222	263									
Bassein	C		4	2	4	1				1							
	D		3	2	4	1				1							
Bombay	C		12					1		1					1		
	D		6					1							1		
Plague-infected rats		37	48	47	57	9	9	12	12	4		11	7	11	13		
Burma	C		16														
	D		10														
Madras Presidency	C	6	21		376		62	30	90			49					
	D	1	9		162		16	30	59			17					
Moulmein	C		9		5												
	D		1		9	2											
Rangoon	C	1	2	1	3					5				1			
	D	1	1	1	2					1				1			
Plague-infected rats		3	6	3	4	1	1	1	1	1							
Indo-China (see also table below): Pnompenh	C	3															
	D	2															
Iraq:																	
Baghdad	C	23	3	1	3						1			1	1		
	D	9	2		1									1			
Maudhan	C											2	1	1			
	D											1		1			
Madagascar (see also table below): Tamatave	C			1	2	1											
Morocco	C					10			8	2	2						
	D								8		4						
Peru (see table below).																	
Senegal (see table below).																	
Siam	C	1		1	4	1	1	1	1	1				1			
	D	1			3	1	1		1	1							
Spain: Hospitalet—Barcelona Province	C			5	2	1	1			5		1	1				
	D			2	1		1			1							
Syria: Beirut	C		2	1	2	1	2					1					
Tunisia: Tunis	C	11			1			1									
	D	1															
Union of South Africa:																	
Cape Province—Plague-infected rats				1													
Orange Free State	C				P				P								

[1] On July 27, 1931, 1,250 cases of plague were reported in Chiobe and Changchow, China, since April. On Sept. 19, 1931, 18 deaths were reported in Changchuanpu and new cases in Kaitung and Fengtien.

[2] On Oct. 17, 1931, plague epidemic was reported in western Shansi Province, China, with 2,000 deaths at Hsinghsien.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		June, 1931	July, 1931	August, 1931	September, 1931	October, 1931	November, 1931
British East Africa (see also table above):							
Kenya	C	154	454	235	14	28	
Ecuador:							
Alamor Parish—Los Hoyos	C				1	3	
Amaluza Parish—Cangochapa	C					2	
Calvas Canton—							
Cariamanga	C				4	1	
Ovejeria	C		1				
Celicia Canton—Choras	C					1	
Loja Canton—							
Lapaz	C				20		
Naimuro	C					2	
Paterillo	C		1				
Tuburo	C					7	
Palas Canton—San Antonio	C				1	1	
Indo-China (see also table above)	C	2	1		1	3	
	D	2	1		1	1	
Madagascar (see also table above):							
Ambositra Province	C	15	1	2	1		
	D	15	1	1	1		
Antsirabe Province	C	12	13	22	19		
	D	12	12	22	19		
Miarinarivo Province	C		8	20	14		
	D		7	14	12		
Madagascar—Continued.							
Moramanga Province	C	1	1	3	12		
	D			3	11		
Tananarive Province	C	10	5	45	65		
	D	9	5	44	63		
Peru	C	5	3	19	2		
	D	1	2	14	2		
Senegal:							
Baol [1]	C		27	101	13	6	
	D		13	[illegible]	[illegible]	2	
Dakar [1]	C	64	95	194	45	4	
	D	56	73	102	31	4	
Diourbel [1]	C				15		10
	D				5		5
Louga [1]	C	4	3	2	16	1	14
	D	2	1	1	4	2	8
Rufisque [1]	C	2	34	2	1	7	
	D					1	
Thies [1]	C	12	16	26	12	7	8
	D	3	7	26	8	5	2
Tivaouane [1]	C	3	3				
	D	2	2				

[1] Reports incomplete.

SMALLPOX

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14	21	28	Dec. 5, 1931
Algeria:																			
Algiers	C	8	1												1				
Constantine	C		1			1													
Belgian Congo	C	42																	
Brazil: Porto Alegre (alastrim)	C	5	41	34	7	18	12	16	12	18		16	7	24					
	D		1	1	2		2			2				3					
British East Africa: Tanganyika	C	7	149	19	31	4	6	9	8	2	1,121	53		18					
	D		17				1	4	4		91	2		2					
British South Africa:																			
Northern Rhodesia	C		21	26							1								
Southern Rhodesia	C	1	2			1	2												
Canada:																			
Alberta	C		1	1					12				1	2	2	1		2	
British Columbia	C		2	5		1	1								1	1			
Manitoba	C	4						1									1	1	
Winnipeg	C						1												
Nova Scotia	C																		
Ontario	C	32	35	5	4		2		5	2	1	9		7	[illegible]	[illegible]		1	
Kingston	C					1													
Ottawa	C	1					1		5	2		1		4	[illegible]	[illegible]			
Toronto	C	1																	
Quebec	C		1																
Saskatchewan	C	54	42	26	8	8	12	5	1	6	3	1	11	[illegible]	[illegible]	[illegible]	13	[illegible]	
Regina	C								1			1							
Chile:																			
Antofagasta	C		1																
Santiago	C												2						
	D												1						
China:																			
Amoy	C	4	2	1			1		1			1	1		1	[illegible]			
	D	3	2	1			1		1				1		1	4			
Canton	C	1	2		1										1				
Foochow	C	P	P	P		P		P		P		P		P		P			
Hankow	C	4	3	3					1					5	4				
Manchuria—Kwantung—Dairen	C	1																	
Nanking	C			1															
Shanghai—																			
Foreigners only	C	11	3					35	29	17	17	1	6	2	12	16	13		
Including natives	D	13	6	1	1		1	5	8					1			6		
Tientsin	C		8																

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14	21	28	Dec. 5, 1931
Chosen (see table below).																			
Colombia: Santa Marta	D						1												
Eritrea	C		2		10														
	D				2														
France (see table below).																			
Great Britain:																			
England and Wales	C	287	187	91	33		19	45	45	41	34	41	39	42	71	63	55	56	
Bradford	C	5																	
London	C	122	54	26	3	9	5	15	5	17	15	21	20	27	55	27	38	27	
London and Great Towns	C	228	152	69	13	30	11	34	35	31	25	37	31	37	66	45	45	48	
	D	1	1																
Sheffield	C						1	1											
Greece (see table below).																			
Honduras: Puerto Castilla	C									1						1			
India	C	7,413	5,359	2,927	483	484	409	329	382	528	258								
	D	1,704	1,352	746	144	108	109	72	100	122	47								
Bombay	C	6	6	2		1	2	2									1		
	D	5	6	1		1											1		
Calcutta	C	47	21	13	2	1	2		1				1						
	D	41	18	9	2	1	2		1				1						
Cochin	C			3					1	1	2	4	3		2				
Karachi	C	2		1									1						
	D	1																	
Madras	C	2	2	1		1			1	5	6	1	2	2		1		2	
	D	1									2							1	
Negapatam	C	3	1	2	3		1			1		1				1			
Rangoon	C	6	3	4	1		1			2		1	1		1		2	2	
	D	2	1	2			1			1	1				1		2	2	
Tuticorin	C				2					4			1		4				
	D									1			1						
Vizagapatam	C	6	5	5	3	1	1	1	2	4			1						
	D	2	1	4	3	1	1	1		1			1						
India (French):																			
Chandernagor	C	1	3																
	D		2																

[illegible]	C	6	[illegible]	[illegible]	[illegible]	2	5			5		3			3				
	D	6	[illegible]	6		2	1			1		3			3				
[illegible] Province	C	7	28	20	1	6	1	18	1	4	14	4	9	18	5				
	D	7	28	20	1	6	1	16	1	4	12	4	9	16	5				
Indo-China (see also table below):																			
Pnompenh	C	2																	
	D																		
Saigon and Cholon	C		3	2	1		3	2	1	4	1			4	2	1	4	6	
	D		1	1	1		2		1	2				4	1		2	1	
Iraq:																			
Baghdad	C	1					1											1	
	D																	1	
Basra	C	1																	
Mosul Liwa	C		1	1					5										
Ivory Coast (see table below).																			
Japan: Nagoya	C		1																
Mexico (see also table below):																			
Jalisco (State)—Guadalajara	D	1	3	2					1	1	2				2		1		
Mexico City and surrounding territory	C	25	22	10	2	2	1		2	1	2	2	1	1	1		3		
	D	13	8	2			1	1	1	2		1	1						
Monterrey	C	1												2					
Torreon	C	3				1	1			1								1	
	D	2					1												
Morocco (see table below).																			
Netherlands: Friesland—Opsterland	C												[1]1						
Nigeria	C								136	318									
	D								39	102									
Panama: Chiriqui	C																		
Poland	C	3	18					1						1		1			3
Portugal: Lisbon	C	48	45	37	10	21	18	17	16	11	6	15	13	15	17	[illegible]	22		
Rumania (see table below).																			
Siam	C	5	1				3												
	D	1	1																
Spain	C		7																
Straits Settlements	C			1															
Sudan (Anglo-Egyptian)	C	1					32										2		
	D						6												
Syria (see table below).																			
Turkey (see table below).																			
Union of Socialist Soviet Republics (see table below).																			
Union of South Africa																			
Natal	C			P			P												
Orange Free State	C	P	P	P	P	P	P		P	P	P								
Transvaal	C	P	P																
Upper Volta	C	12	2																
	D																		
On vessel:																			
S. S. Taif (pilgrim ship) at Suakin from Jeddah	C			1															

[1] Imported case.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14	21	28
Lithuania (see table below).																		
Mexico:																		
Durango	D		1															
Guadalajara	D			1														
Mexico City, including municipalities in Federal District	C	46	53	18	5	1	2	2	4	2	5	3	7	3	1		7	
	D	19	12	10	1	1		2	2	2	2	2	2	2			1	
San Luis Potosi	D		4	1														
Torreon	C		1								1	1		3				
	D		1								1	1		5	1			
Morocco	C	101	102	8						1		3		1				
	D	6	8															
Palestine	C	5	2	11				4	4	1	1		2		1			1
Paraguay: Asuncion	D						1											
Poland	C	97	53	31	6	2	1	2	2	8	3	1	2	6	6	6		
	D	4	5	2						1				1	2			
Rumania	C	80	11	23		4	6	3	1	6	7	4	12	12				
	D	13	5	2				1			2	1	3	3				
Tunisia: Tunis	C	73	2		1		1	1								3		
	D	4																
Turkey (see table below).																		
Union of Socialist Soviet Republics (see table below).																		
Union of South Africa:																		
Cape Province	C	P	P	P	P	P	P	P	P	P	P	P	P	P				
Municipality of East London	C	1		1														
Natal	C	P	P	P			1					P						
Orange Free State	C	P	12									P	P	P				
Transvaal	C	P	P	P	P	P	P	P	P	P	1	P	P	P				
Yugoslavia (see table below).																		

Place		April, 1931	May, 1931	June, 1931	July, 1931	August, 1931	September, 1931	October, 1931
Chosen: Seoul	C	4		6	1			
	D	1		1	1			
Czechoslovakia	C	5	11	2				
Greece	C	22	6	9	2	13	9	
	D	3				2	1	
Guatemala	C			33	34	3		
	D			15	5			
Lithuania	C	34	10	13	8	2		
	D	5		2				
Turkey	C	32	13	11	9		16	1
Union of Socialist Soviet Republics	C	1, 513	1, 324					
Yugoslavia	C	43	14	2	3	1		
	D	5						

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931: 5	12	19	26	October, 1931: 3	10	17	24	31	November, 1931: 7	14	21	28	December, 1931: 5	12
Brazil:																				
Alagoas State	C			3																
	D			2																
Maceio	D														1					
Ceara State	C	1		1																
	D			1																
Pernambuco Province	C				2															
	D				2															
Recife	C								1											
	D								1											
Sergipe State	C	1																		
British Cameroons: Mamfe	C	2																		
Colombia: Magdalena Province—Near Cienaga	C		4																	
Gold Coast:																				
Akuse	C		2																	
	D		1																	
Dagomba District	C			4																
Kete Krachi	C										1									
Kintampo	C		1																	
	D		1																	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		May 31–June 27, 1931	June 28–July 25, 1931	July 26–Aug. 22, 1931	Week ended— Aug. 29, 1931	September, 1931				October, 1931					November, 1931				December, 1931	
						5	12	19	26	3	10	17	24	31	7	14	21	28	5	12
Gold Coast—Continued.																				
Oda	C							1												
	D							1												
Salaga	C																		1	
	D																		1	
Tamale	C		2						2				1					2		
	D		2						2											
Wale Wale	C			1																
	D			1																
Ivory Coast:																				
Bobo Dioulasso	C		1																	
	D		1																	
Grand Bassam	C			4			1													
	D			2			1													
Kong Circle	C		4																	
Seguela	C			P																
Tehini	C														1					
Nigeria	C			1									1			1		1		
	D			1												1		1		
Senegal:																				
Podor (Hinterland)	C			1																
	D			1																
St. Louis	C								1											
Thies	C								1											
	D								1											
Sudan (French)	C		4																	
Macina—Kayo Circle	C															2				
	D															2				
Togo (French): Atakpame—Anie Circle	C														1					1
	D														1					

Upper Volta:																				
Banfora	C		2						2											
	D		1						1											
Dedougou	C													2						
Diarabakoko	C								2											
	D								1											
Ouagadougou	C				1				1			1								

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